

Nevus of Ota: Effective Treatment by Laser

Maha Rafei Hassan Abu-Eittah^{1,*} and Mahmoud Saber El-Bassiony²

¹Lecturer, Medical Application Department, National Institute of Laser Enhanced Sciences, Cairo University, Egypt

²Associate Professor, Medical Application Department, National Institute of Laser Enhanced Sciences Cairo University, Egypt

Abstract: The nevus of Ota is a dermal nevus characterized by bluish pigmentation in the distribution of the first and second division of trigeminal nerve. A total of ten cases were included in our study, detailed history and complete clinical examination were done for all patients. Most of the patients had lesions at birth and the majority was females. The treatment was done by Q-Switched Nd:YAG laser 1,064 nm and fractional 2940nm Er:YAG laser. 34% show excellent results, 53% show good results, while 13% show poor results.

Objective: The aim of this study is to explore the long lasting results of Q-Switched laser in association with fractional laser for treatment of nevus of ota.

Keywords: Fractional Er:YAG Laser, Melanosis, Nevus of Ota, Q-Switched Nd:YAG Laser.

INTRODUCTION

The nevus of ota is a hypermelanotic melanocytic phacomatosis characterized by unilateral macular hyperpigmentation usually blue and grey in color involving the skin of forehead, temple or eyelids over distribution of 1st and 2nd division of trigeminal nerve [1,2]. It is usually associated with ocular melanosis and intracranial melanosis [3].

The blue nevus, the nevus of Ota and Ito, and Mongolian spot are all classified as benign dermal melanocytoses [4,5]. Histologically the above mentioned lesions are characterized by the presence of increased number of dermal melanocytes deep in the dermis, scattered between collagen differing in size, depth, location, and concentration. The blue color of these lesions is because of the optical effects of light reflecting off melanin deep in the dermis [6].

Topical treatments such as hydroquinone, kojic acid, azelaic acid and topical corticosteroid lightens the skin by reducing the pigment production in melanocytes, however, it is only temporary improvement [7], and can produce long-term complications. Early studies of laser treatment often used pigment-specific lasers and light sources used for treating pigmented skin lesions and tattoos such as 510nm dye laser [8,9]. Treatment with ablative CO₂ and Er:YAG lasers is very painful with side effects include infection, scarring and permanent hypopigmentation.

PATIENTS AND METHODS

The research ethical committee of National Institute of Laser Science has approved this study. Informed consent was taken from all patients included in this study.

This study was done at Cairo University in National Institute Of Laser Enhanced Science (NILES) at dermatology out clinics. The study was conducted for a period of 20 months from January 2013 to August 2014. A detailed history regarding the age of onset, site of lesion, duration and any past treatment were obtained. Detailed dermatological and systemic examinations were carried out, Wood's lamp examination was done to show the depth of pigmentation either dermal or epidermal and direct ophthalmoscopy to visualize pigmentation in the retina.

Ten patients with seven females and three males with age ranging from 18-35 years, skin type III and skin type IV were there in our study. Every patient received laser treatment for eight sessions with 4 weeks interval between each session to improve the rate of clearing and prevent epithelial re-pigmentation and follow up for one year. Photos were taken before and after the treatment sessions by Fuji digital fine pix S4000 16 mega pixels 4.0 high resolution LCD wide 24mm 30x before each treatment session and 6 months after the final treatment session. The lasers used are Q-Switched Nd: YAG laser with 1,064nm and fractional Er:YAG laser with 2940nm.

All patients used Emla cream one hour before session and sunscreen lotion when exposed to the sun. All patients used Q-Switched Nd: YAG for four

*Address correspondence to this author at the Department of Medical Application, National Institute of Laser Enhanced Sciences, Cairo University, Egypt; E-mail: manalrafei@yahoo.com

sessions and four sessions with fractional laser on one side of the face, while the other side of the face used only Q-Switched Nd: YAG laser for eight sessions.

All patients did not receive any treatment before laser treatment, or during laser treatment.

The Q-Switched Nd-YAG laser parameters are 3-6 J/cm². While fractional laser parameters are 8J/cm². There were no side effect as erythema, edema, hypopigmentation, and crusting with Q-Switched YAG laser treatment, while there were erythema and crusting with fractional laser treatment. The assessments evaluations of the nevus color were performed separately for each side of the face, (0-30%) poor improvement, (30%-60%) good improvement and (60%-100%) excellent improvement [10].

RESULTS

Clinical Findings

Ten cases (7 females and 3 males), age ranged from 18 to 35 years with a mean age of 25 years. Four of them were skin type IV and the rest cases were skin type III. Figure 1a and 1b show the patient before and after QS laser treatment (good results). Figure 2a and 2b show the patient before and after combined laser treatment (excellent results). Figure 3a and 3b show the patient before and after QS laser treatment (poor results). Figure 4a and 4b show the patient before and after combined laser treatment (good results). Figure 5 shows the percentage results of the lasers treatment.

In this study, the combined laser treatment had shown an 'excellent' response in 3 (30 %) patients as shown in Figure 2, A 'good' response was noticed in 5



a



b

Figure 1: a: Before Q-S laser treatment. b: After Q-S laser treatment.



a



b

Figure 2: a: Before combined laser treatment. b: After combined laser treatment.



Figure 3: a: Before Q-S laser treatment. b: After Q-S laser treatment.



Figure 4: a: Before combined laser treatment. b: After combined laser treatment.

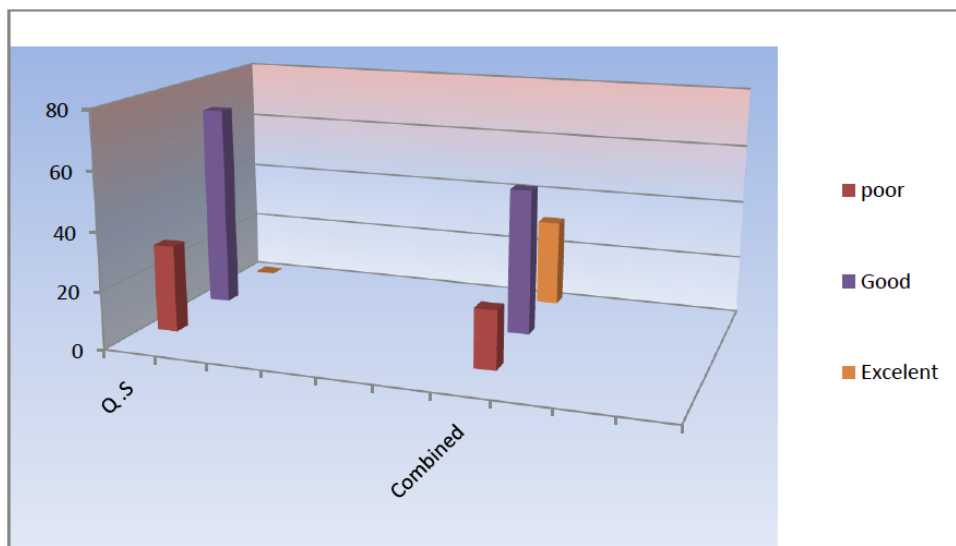


Figure 5: Histogram showing the percentage of improvement results of the applied laser types in treatment of nevus of Ota.

(50 %) patients as shown in Figure 4 while a 'poor' response was noticed in two patients (20%) with nevus of Ota. All the cases received 8 sessions; four sessions with QS Nd: YAG followed by four sessions with fractional laser on one side of face, the other side of the face received 8 sessions by QS Nd: YAG laser only. The QS. Laser treatment showed no excellent response, while good response was noticed in six (60%) patients as shown in Figure 1, and poor response was noticed in four (40%) patients as shown in Figure 3. The complication which occurs after fractional laser as erythema and crusting were treated by topical antibiotics and using sunscreen when exposed to sun.

DISCUSSION

Q-Switched lasers have been widely used to treat pigmented lesions because of their low potential for scarring and erythematic complication. The Q-Switched lasers selectively target melanosomes present in melanocytes, keratinocytes and phagocytes [11,12]. The effectiveness of Q-Switched lasers is based on the theory of selective photothermolysis, which requires a specific wavelength of energy to be delivered in a period of time shorter than the thermal relaxation time of the target chromophore (melanosomes) in order to restrict the injury to the target while minimizing collateral damage. Q-Switched lasers induced selective [13,14] photothermolysis of melanosomes by producing high temperature between melanosomes and the surrounding structures, resulting in melanosomes fracture. High-pressure acoustic waves are produced and then result in melanocytes death. The Q-Switched lasers in combination with non-ablative fractional lasers offer a safe and effective noninvasive technique to deliver a pattern of very small laser beams, which produce micro thermal zones of coagulated tissue or wounds that act as a stimulus for skin rejuvenation [15,16]. Fractional lasers were developed for skin rejuvenation, and when used to treat photo damaged pigmented lesions lightening occurs over a series of successive treatments to effect long-term clinical improvement by pixilated destruction of epidermal and dermal tissue which are subsequently eliminated from the skin surface [17,18]. Due to the pixilated delivery of laser light and the tissue destruction, this can provide the deeper dermal treatment needed to effect lesional eradication and offers unique advantages for the treatment of epidermal nevi according to the variability in depth of involvement, fractional laser treatment requires an average of four to six sessions in order to

produce uniform lightening of pigmented skin lesion [19]. Each treatment is associated with five days of erythema, edema, and crusting which were treated by topical antibiotics for one week.

CONCLUSION

This study demonstrates that this unique combination of Q-Switched Nd-YAG laser treatment in conjunction with fractional 2940nm Er:YAG laser is a safe and effective treatment for nevus of Ota for patients of skin types III and IV, there was no correlation found between skin type and number of treatment sessions or the laser used. The treatments are fast and painless and can be repeated if rebounds occurs.

REFERANCES

- [1] Lui H, Zhou Y. Nevi of Ota and Ito. E-medicine: Instant access to the minds of Medicine 2006. <http://www.emedicine.com/DERM/topic290.htm>
- [2] Mukhopadhyay AK. Nevus of Ota associated with nevus of Ito. Indian J Dermatol Venereol Leprol 2004; 70: 112-3.
- [3] Piercecchi-Marti MD, Mohamed H, Liprandi A, Gambarelli D, Grisoli F, Pellissier JF. Intracranial meningeal melanocytoma associated with ipsilateral nevus of Ota. Case report. J Neurosurgery 2002; 96: 619-23. <http://dx.doi.org/10.3171/jns.2002.96.3.0619>
- [4] Lee B, Kim YC, Kang WH, Lee ES. Comparison of characteristics of acquired bilateral nevus of Ota-like macules and nevus of Ota according to therapeutic outcome. J Korean Med Sci 2004; 19: 554-9. <http://dx.doi.org/10.3346/jkms.2004.19.4.554>
- [5] Sekar S, Kuruvila M, Pai HS. Nevus of Ota: a series of 15 cases. Indian J Dermatol Venereol Leprol 2004; 74: 125-7. <http://dx.doi.org/10.4103/0378-6323.39695>
- [6] Jellinger K, Chou P, Paulus W. Melanocytic Lesions In: Kleihues P, Cavenee K(eds). Pathology and Genetics: Tumours of the Nervous System. Lyon: IARC Press 2005; pp. 193-5.
- [7] Grimes PE. A microsp sponge formulation of hydroquinone 4% and retinol 0.15% in the treatment of melasma and postinflammatory hyperpigmentation. Cutis 2004; 74: 362-8.
- [8] Polder KD, Landan JM, Verqilis-Kalnerij, et al. Laser Eradication of Pigmented Lesions. Dermatol Surgery 2011; (37): 2-595.
- [9] Thomas JL, Lister TS, Royston SL, et al. Adverse effects following Q-Switched ruby laser treatment of pigmented lesions. J Cosmet Laser Therapy 2010; 12(2): 101-5. <http://dx.doi.org/10.3109/14764171003706190>
- [10] Levy J, Pons F, Agopian L, Besson R. Subjective and objective measurement methods in cosmetic dermatology. Med Laser Appl 2004; 19: 223-229. <http://dx.doi.org/10.1078/1615-1615-00146>
- [11] Wattanakrai P, Mornchan R, Eimpunth S. Low-fluence Q-switched Nd-YAG (1,046nm) laser for the treatment of facial melasma in Asian. Dermatol Surg 2010; 36(1): 76-87. <http://dx.doi.org/10.1111/j.1524-4725.2009.01383.x>
- [12] Schiaffino MV. Signaling Pathways in melanosome biogenesis and pathology. Int J Biochem Cell Biol 2010; 42(7): 1094-104. <http://dx.doi.org/10.1016/j.biocel.2010.03.023>

- [13] Lee HS, Won CH, Lee DH, *et al.* Treatment of melasma in Asian skin using a fractional 1,550-nm laser: An open clinical study. *Dermatol Surg* 2009; 35(10): 1499-1504. <http://dx.doi.org/10.1111/j.1524-4725.2009.01264.x>
- [14] Chan NP, Ho SG, Shek SY, Yeung CK, Chan HH. A case series of facial depigmentation associated with low fluence Q-Switched 1,064nm Nd-YAG Laser for skin rejuvenation and melasma. *Lasers Surg Med* 2010; 42: 712-9. <http://dx.doi.org/10.1002/lsm.20956>
- [15] Salem A, El-Harras M, Ramadan A, *et al.* Use of Q-Switched Nd-YAG Laser for Treatment of Pigmentary Disorders in Egyptians. *J Cosmetic Laser Therapy* 2010; 12: 92-100. <http://dx.doi.org/10.3109/14764171003706109>
- [16] Angsuwarangsee S, Polnikorn N. Combined ultrapulse CO2 Laser and Q-Switched alexandrite Laser compared with Q-Switched alexandrite alone for melasma: Split-face design. *Dermatol Surg* 2003; 29(1): 59-64.
- [17] Wind BS, Kroon MW, Meesters AA, *et al.* Non-ablative 1,550nm fractional laser therapy versus triple topical therapy for the treatment of melasma: A randomized controlled split-face study. *Lasers Surg Med* 2010; 42: 607-12. <http://dx.doi.org/10.1002/lsm.20937>
- [18] Suh KS, Sung JY, Roh HJ, Jeon YS, Kim YC, Kim ST. Efficacy of the 1,064nm Q-Switched Nd-YAG Laser in Melasma. *J Dermatol Treat* 2011; 22: 233-8. <http://dx.doi.org/10.3109/09546631003686051>
- [19] Laubach HJ, Tannous Z, Anderson RR, Manstein D. Skin responses to fractional photothermolysis. *Lasers Surg Med* 2006; 38: 142-9. <http://dx.doi.org/10.1002/lsm.20254>

Received on 04-05-2015

Accepted on 05-06-2015

Published on 15-01-2016

DOI: <http://dx.doi.org/10.12970/2310-998X.2015.03.02.1>