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The Importance of Evidence-Based Medicine (EBM) In Aesthetic

Evidence Based Medicine (EBM) is widely used in many healthcare fields, which is indicative of its broad influence. EBM is a crucial instrument for promoting social justice. It has the potential to be a great equaliser if used correctly, aiming to provide patients in different areas of the world with equitable care. EBM also has a significant impact on policy-making, and politicians frequently cite their use of research data in support of the legitimacy of their actions.

A wide range of products and procedures had been introduced into the market for aesthetic purposes ranging from skincare products such as serum, moisturizer, eye cream to skin rejuvenation procedures such as skin tightening, pigment removal, anti-wrinkle treatment, acne scar treatment, skin whitening and filler, breast enlargement, cellulite removal, lip enhancement, facelift and several others. However, many of these products and procedures claim to have good aesthetic effects but it is not supported by good scientific evidence and may contain harmful or prohibited ingredients. This has been considered to be a growing problem that needs to be addressed immediately as it involves safety issues of the patients and consumers by causing various complications due to the lack of evidence of the procedures or treatments.

General Public in Malaysia still lack of awareness in the importance of EBM in aesthetic medicine. Hardly the patient will ask on the effectiveness and safety based on published clinical trial for the specific treatment. Most of the time, aesthetic practitioners with the

best convincing talk will gain the most from this situation.

There is a need to implement a guideline to ensure the safety of the aesthetics products or procedures. One of the ways to achieve this is through evidence-based medicine (EBM). Mountokalakis (2006)¹ stated that, a physician needs to “rely on actual evidence rather than on conclusions resulting solely from reasoning, because arguments in the form of idle words are erroneous and can be easily refuted”.

EBM has been defined as the conscientious, explicit and judicious use of current best evidence in making decisions related to individual patient care [2]. EBM is important as it provides the most effective care based on available evidence for patients in order to improve the patient’s outcomes thus protecting the patients from ineffective, unnecessary or potentially harmful treatments or procedures. EBM has existed since centuries ago. It was recorded that a person named Ben Cao Tu Jing had suggested finding two people and giving ginseng to one of them. Then, they were asked to run and he said the one who didn’t consume ginseng will have shortness of breath first [3]. This is one of the examples of the ancient anecdotal form of EBM.

There are five level scale of EBM which is:

Level I: double blind randomized controlled trial (DBRCTs)

Level II: large prospective of cohort studies with RCTs

Level III: retrospective case-control cohort studies and nonrandomized clinical studies

Level IV: case studies without control group

Level V: expert opinion.

Among the scale, level I EBM provides the most reliable evidence and has highest validity due to detailed examination of the cause-and-effect relationship between intervention and outcome. Meanwhile expert opinion is assigned to level V because it was not based on scientific evidence but rather was influenced by prestige and persuasion [4,5]. This five-level scale was created based on the strength and impact of various investigations and it may help clinicians to identify the best evidence for prevention, diagnosis, treatment, and causation to achieve the best outcomes for the patients [4].

We can create awareness about EBM by using available and effective platform to reach out to general public. They should understand the significant of clinical trial in every aesthetic services available. In fact, general public can be the external force to encourage aesthetic practitioners and researcher to conduct more high impact clinical trial in this field. This eventually will eliminate “testimonial” based

outcome in promoting aesthetic services and adapting to the EBM principle.

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Treatment of Freckles (Ephelides) Concurrent with Hori's Nevus (ABNOM) Using a Combination Treatment of Q-Switched Nd:YAG 1064nm Laser with 660nm (RuVY) Laser

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Abstract

Ephelides and Acquired Bilateral Nevus of Ota-like Macules (ABNOM) are common skin pigmentations in Asian and Caucasians that have become a cosmetic concern nowadays. We hereby present the case of a 34-year-old Chinese lady with Fitzpatrick type III skin who presented with hyperpigmentation over bilateral cheeks and the nose for 20 years. We have diagnosed her to have ephelides concurrent with acquired bilateral nevus of Ota-like macules (ABNOM) based on her clinical presentation. She was treated with Q-Switched Nd: YAG laser with a converted wavelength of 660nm (RuVY Touch) targeting ephelides and a wavelength of 1064nm targeting ABNOM. Her hyperpigmentations responded well to the Q-Switched Nd: YAG laser and were completely clear after 10 sessions of laser therapy.

In conclusion, our findings show that combining Q-switched Nd:YAG laser treatment with RuVY 660 nm laser treatment is effective in treating patients with freckles (ephelides) concurrent with Hori's nevus (ABNOM).

Keywords: Freckles (Ephelides), Hori's Nevus, ABNOM, Q-Switched Nd: YAG laser

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Freckles, also known as ephelides, are caused by an increase in melanin, a dark pigment found in the epidermis layer of the skin. Ephelides are small macules that range from 1-2 millimetres or bigger and can be red, light brown, or dark brown in colour. These spots are more likely to appear on sun-exposed skin, such as the cheeks, nose, forehead, and arms. It faded during the winter and became more pigmented during the summer [1]. Ephelides can manifest as early as 2–3 years after sun exposure, increase during adolescence, and often partially disappear with age. It is also more prevalent in individuals with fair skin and red or blond hair [2]. Ephelides are caused by genetic predisposition and induced by UV radiation from sunlight. It is photosensitive and can be induced or, more likely, made visible in those who already have it [1]. Various treatment modalities have been used to treat ephelides. Previously, dermabrasion, electrodesiccation, and chemical peeling were used to treat ephelides. However, this treatment can result in unfavourable side effects, such as scarring.

Over the last decade, ephelides have been reported to clear significantly with QS Nd:YAG 532nm lasers due to the high melanin absorption rates at this wavelength [3]. However, 532nm is also highly absorbed by hemoglobin. As a result, it may increase the risk of superficial vascular injury, which causes erythema and post-inflammatory hyper-pigmentation. As technology advanced, RuVY Touch (Ruby-like Versatile YAG) 660nm became a safety-proven new pigment removal treatment performed by converting 532nm QS Nd:YAG laser energy to 660nm laser energy [4]. RuVY Touch 660 nm is a safer wavelength than 532nm for treatment of epidermal pigmented lesions due to its lower absorption by melanin and oxy- and deoxy-hemoglobin. The lower absorption characteristics of 660 nm in oxy- and deoxy-hemoglobin allow vessels to remain intact even after laser treatment, therefore significantly reducing the possibility of having post-inflammatory hyperpigmentation. Besides, it can be as effective as a 532nm

wavelength in removing ephelides (Lutronic corporation 2019).

On the other hand, Hori et al. (1984)⁵ first described the acquired bilateral nevus of Ota-like macules (ABNOM), also known as Hori's nevus in 1984, and it is classified as a circumscribed dermal melanosis. It presents clinically as multiple symmetrical speckled macules with a brown, slate-grey, or blue-black hue in colour. The number of spots on each malar region varies, and some guttate macules progress to form confluent, large macules over time. It is prevalent in women of Asian descent and only rarely in men [6] and known to develop after the age of 15 (mean age: 36) in approximately 94% of cases [7] Hori's nevus is located bilaterally on the face in the trigeminal nerve distribution, more commonly in the malar areas and less commonly at the forehead, temples, upper eyelids, and nose. There is no pigmentation on the ocular or mucosal membranes, which differentiates it from the Nevus of Ota, a unilateral Mongolian spot-like macular blue-black or grey-brown patchy pigmentation [7]. The pathogenesis of this condition is unknown. However, several theories have been proposed. This includes dropping-off of epidermal melanocytes, migration from follicular bulb melanocytes, and reactivation of pre-existing misplaced latent dermal melanocytes from faulty migration during embryological development, which is triggered by dermal inflammation, UV radiation, or aging-related degeneration of the epidermis and dermis melanocytes [5].

Lee et al. (2004)⁷ reported that in the management of Hori's nevus, topical depigmentation therapy and chemical peels do not achieve significant lightening in the treatment of dermal pigmentation. Other methods for instant dermabrasion produce excellent results, but they are invasive and may result in scarring. The development of lasers revolutionised the treatment of dermal pigmentation with their theory of selective photothermolysis. Q-switched lasers such as QS Ruby, QS alexandrite, and QS

Nd:YAG lasers have been shown to be effective in treating ABNOM.

This case report will be focusing on the treatment of ephelides and Hori's nevus by using Q-switched Nd: YAG lasers of different wavelengths and their treatment outcome.

Case Presentation

A 34-year-old Chinese lady, Fitzpatrick type III with no known medical illness presented to our clinic with hyperpigmentation over bilateral cheeks and nose for 20 years. She is married with 2 kids, with the age of 6 years old and 3 years old. Her menstrual cycle is regular and she is not on hormonal contraceptive pills. She works as an engineer in an indoor office. She is actively involved in outdoor activities during leisure time and she goes for evening jog at least twice a week. Her hyperpigmentation got worse after a few picnic sessions with her family at the beach over the weekends. She has a positive family history of having similar hyperpigmentation, which affects her elder sister and her mother. She has not sought any treatment for her hyperpigmentation prior to this. Her skincare regime comprises mild cleanser, toner, serum, moisturiser and sheet mask. She does not apply sunblock due to finding it being tacky on her skin. She was concerned about her hyperpigmentation as it continued to worsen which led to uneven skin-tone appearance. She had low self-esteem and tried to use concealers in an attempt to cover up her hyperpigmentation, however she found it challenging to completely cover the pigments. On physical examination, there were multiple brown, flat, circular spots, covering bilateral cheeks and nose. She also had a few slate-grey coloured, round, grain-like spots confined to her cheekbone amidst the hyperpigmentation mentioned earlier. She has a mixed-pattern type of hyperpigmentation and was diagnosed with ephelides (freckles) and Hori's Nevus (also known as ABNOM-acquired bilateral nevus of Ota-like macules). She also had some moles on her face for which she was keen to remove as well.

Management and Outcome

The patient had undergone laser treatment of the entire face by a single doctor after obtaining written informed consent. A total of 10 sessions of laser treatment were conducted with treatment intervals of 1 to 3 months. As the patient was presented with a mixture of two different types of hyperpigmentation - abnom and freckles, a combination treatment using Q-switched Nd:YAG laser with a wavelength of 1064nm and Q-Switched Nd:YAG laser with a wavelength of 660nm (RuVY Touch (Ruby-like Versatile YAG)) was used.

For the treatment of freckles (ephelides), Q-switched Nd:YAG laser with a wavelength of 660nm (RuVY Touch (Ruby-like Versatile YAG)) was used. The pulse rate was set at 1Hz, with a spot size of 3mm and fluence ranging from 0.75J/cm² to 1.1J/cm² (as shown in Table 1).

For the treatment of Hori's nevus (ABNOM - acquired bilateral nevus of Ota-like macules), Q-switched Nd:YAG laser with a wavelength of 1064nm was used. The pulse rate was set at 5Hz, with a spot size of 4mm and fluence ranging from 4.6J/cm² to 6.0J/cm² (as shown in Table 1), with pulse stacking technique of 5 to 10 seconds. The melanocytic nevi (moles) were removed using electrocauterization in one treatment session.

Photos of the patient were taken immediately before and immediately after each treatment session. The evaluation was performed by standardized digital photography using the camera of an iPhone at a specific photo corner of the room, with the same lighting. The patient was asked to report any pain or discomfort during the procedure.

The treatment outcome was satisfactory with a Global Aesthetic Improvement Scale (GAIS) of 1 -very much improved (as shown in Figure 2 to Figure 6). The patient was very satisfied with the result. There were no significant side effects such as post-inflammatory hyperpigmentation (PIH) or scar observed after

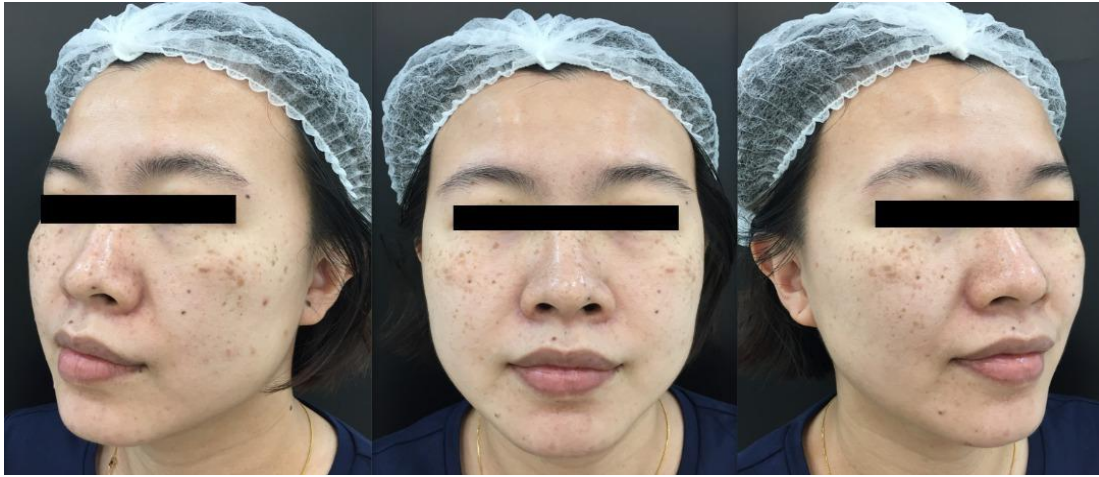


Figure 1: Left face (45 degree), front and right face (45 degree) view photos of the patient during her first presentation. Note that there were multiple freckles over bilateral cheeks and nose as well as Hori's nevus over her bilateral cheekbone prominence.



Figure 2: Front view photos of the patient. Left: 1st presentation. Middle: After 5 treatment sessions. Right: Final 10th treatment session.



Figure 3: Left face (45-degree angle) photos of the patient. Left: 1st presentation. Middle: After 5 treatment sessions. Right: Final 10th treatment session.



Figure 4: Left face (90-degree angle) photos of the patient. Left: 1st presentation. Middle: After 5 treatment sessions. Right: Final 10th treatment session.

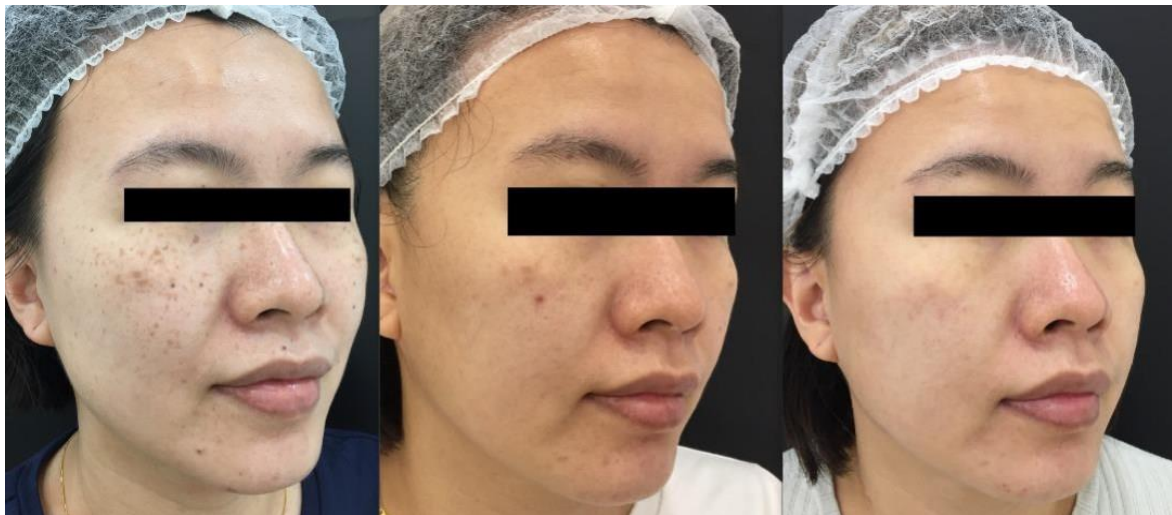


Figure 5: Right face (45-degree angle) photos of the patient. Left: 1st presentation. Middle: After 5 treatment sessions. Right: Final 10th treatment session.



Figure 6: Right face (90-degree angle) photos of the patient. Left: 1st presentation. Middle: After 5 treatment sessions. Right: Final 10th treatment session.

Table 1: Parameters used in the laser treatment of patient's Hori's nevus using Q-switched Nd:YAG laser 1064nm and freckles using Q-switched Nd:YAG laser 660nm (RuVYTouch)

Session	Date	Mode	Spot Size (mm)	Fluence (J/cm ²)	Pulse Rate (Hz)
1	24/4/2021	Q-switched Nd:YAG 1064nm	4	4.6	5
		Q-switched Nd:YAG 660nm (RuVY Touch)	3	0.85	1
2	3/7/2021	Q-switched Nd:YAG 1064nm	4	5.0	5
		Q-switched Nd:YAG 660nm (RuVY Touch)	3	0.90	1
3	7/9/2021	Q-switched Nd:YAG 1064nm	4	5.6	5
		Q-switched Nd:YAG 660nm (RuVY Touch)	3	0.90	1
4	8/10/2021	Q-switched Nd:YAG 1064nm	4	5.6	5
		Q-switched Nd:YAG 660nm (RuVY Touch)	3	0.85	1
5	2/11/2021	Q-switched Nd:YAG 1064nm	4	5.6	5
		Q-switched Nd:YAG 660nm (RuVY Touch)	3	0.80	1
6	9/12/2021	Q-switched Nd:YAG 1064nm	4	5.8	5
		Q-switched Nd:YAG 660nm (RuVY Touch)	3	0.75	1
7	20/1/2022	Q-switched Nd:YAG 1064nm	4	6.0	5
		Q-switched Nd:YAG 660nm (RuVY Touch)	3	1.0	1
8	30/3/2022	Q-switched Nd:YAG 1064nm	4	6.0	5
		Q-switched Nd:YAG 660nm (RuVY Touch)	3	0.85	1
9	14/5/2022	Q-switched Nd:YAG 1064nm	4	4.6	5
		Q-switched Nd:YAG 660nm (RuVY Touch)	3	0.75	1
10	26/8/2022	Q-switched Nd:YAG 1064nm	4	5.8	5
		Q-switched Nd:YAG 660nm (RuVY Touch)	3	1.1	1

the treatment, except for mild pricking sensation during the procedure which was tolerable without the requirement of any local anaesthesia.

Discussion

Pigmentary disorders appearing on the face, even if they are benign, frequently cause cosmetic and psychological problems to many people, especially women. Q-switched (QS) lasers are widely used to effectively treat a variety of cutaneous pigmentation lesions. In this study, we intend to study the treatment of freckles (ephelides) concurrent with Hori's Nevus (ABNOM) using a combination treatment of Q-Switched Nd:YAG 1064nm laser with Q-Switched Nd:YAG 660nm (RuVY) laser.

Treatment of freckles and lentigines with the Q-switched Nd:YAG (QSNY) is usually applied with the frequency-doubled 532nm visible green beam, but overtreatment can cause separation or even damage at the dermoepidermal junction leading to post-inflammatory hyperpigmentation (PIH) formation. The 660nm beam is highly absorbed in melanin to ensure subcellular selective photothermolysis. On the other hand, the 660nm energy is significantly less well absorbed in blood, removing that element as a competing chromophore and making it a safer treatment, helping to minimise inflammation in the epidermis [8].

For the treatment of freckles (ephelides) in this patient, Q-switched Nd:YAG laser with a wavelength of 660nm [RuVY Touch (Ruby-like Versatile YAG)] was used. Using a handpiece equipped with solid dye, 532nm QS Nd:YAG laser energy can be converted to 660nm laser energy for use in ruby-like versatile YAG(RuVY) laser treatment. Compared with the 532 nm wavelength which was the previous wavelength of choice, the 660nm beam offers significantly lower oxy- and deoxyhemoglobin absorption, and therefore less damage to superficial blood vessels with reduced side effects due to inflammation or aggressive

reactions and reduced possibility of PIH. The absorption of melanin is still high, but with slightly lower absorption compared with the 532nm beam, the safety level for treatment of discrete epidermal lesions is increased (Lutronic corporation 2019).

Patient was treated with 10 sessions of Q-switched Nd:YAG laser with RuVY treatment. The 660nm RuVY touch can deliver intense energy onto the same spot size compared with 532nm and can precisely treat only the lesion. Unnecessary heat damage to the surrounding areas is therefore contained as the undesired laser energy is not delivered. Accordingly, skin reaction is comparatively milder after RuVY Touch treatment, which is an advantage to the clinician, enabling him or her to treat epidermal pigmented lesions with a low potential for pigmentation after inflammation. The milder skin reaction also means faster healing and less unsightly erythema and crusting, which is an advantage for the patient (Lutronic corporation 2019).

ABNOM is an acquired disease, usually appearing during the fourth or fifth decades of life, and is usually bilateral [9]. The diagnosis of ABNOM was made by clinical appearances, according to the description by Hori et al. and skin biopsies were not performed. The colour of ABNOM was categorised into one of four groups, namely brown, slate-grey, brown-blue and blue [10].

Although dermabrasion has been successful in the treatment of ABNOM [11], this procedure is highly invasive and is associated with many complications, including scarring, infection and post-inflammatory hyperpigmentation. Therefore, QS lasers are the main treatment modalities for ABNOM as well as for nevus of Ota [9].

For this patient's Hori's nevus, Q-switched Nd:YAG laser with a wavelength of 1064 nm was used. The laser fluence used was 4.6J/cm² to 6.0J/cm², at a repetition rate of 5Hz, spot size of 4mm and pulse stacking technique of 5 to 10 seconds. Treatment sessions are

performed at 1-3 months intervals. This short interval was chosen to improve the rate of clearing and prevent epithelial repigmentation. Epidermal melanin and melanocytes are competing chromophores for dermal pigment laser therapy and increase the risk of post-inflammatory hyperpigmentation. By performing treatment sessions at short intervals, more photons can target the dermal chromophores through the hypopigmented epithelium while avoiding scattering of the beam [12]. In addition, heat has little effect on the hypopigmented epidermis, thereby preventing post-laser hyperpigmentation (PLH) [7].

Histologically, in ABNOM, dermal melanocytes are scattered throughout the upper and middle portions of the dermis, whereas in nevus of Ota, melanocytes are diffused throughout the entire dermis [5]. In addition, ABNOM is characterised by prominent epidermal hypermelanosis together with dermal melanophages. Variations in colour (brown, grey, blue) are due to the proportion of pigmented cells in the epidermis and dermis [13]. Although the pathogenesis of ABNOM is unclear, it may be due to 'epidermal melanocyte migration' [5]. This mechanism is consistent with the fact that the colour of the macules varies with the maturity of the ABNOM. Initially these macules are usually brown and discrete, becoming bluish-grey and diffuse over time. The early-stage brown lesions are thought to be due to the presence of melanocytes at the basal layer of the epidermis; their subsequent migration into the dermis leads to a darker bluish-grey colour [14].

In agreement with the epidermal migration hypothesis, early-stage brown lesions have more epidermal melanosis, and post-laser hyperpigmentation (PLH) is more likely to occur in epidermis that contains abundant melanin. Moreover, melanocytes in ABNOM contain immature melanosomes, which are at stage II melanisation [15]. In cases of early-stage brown ABNOM, there are more melanocytes with immature melanosomes, and

laser treatment may fail to destroy these amelanotic melanocytes; this may activate immature melanocytes, leading to PLH [16]. Thus, care should be taken when treating patients with early-stage disease [9].

In conclusion, our findings show that combining Q-switched Nd:YAG 1064nm laser treatment with Q-Switched Nd:YAG 660nm (RuVY) laser treatment is effective in treating patients with freckles (ephelides) concurrent with Hori's nevus (ABNOM).

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Diode laser in hair removal: A Case Report

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Abstract

Laser hair removal has grown to be one of the popular aesthetic treatments as it is considered safe and more efficient in hair reduction compared to other methods such as plucking, shaving and waxing which are required to be done on a regular basis. Besides that, these procedures may cause unwanted effects such as post-inflammatory hyperpigmentation. Nonetheless, patients with Fitzpatrick scale V and VI have a higher risk of hypopigmentation, hyperpigmentation, scarring and keloid formation following hair removal treatment which required further adjusting of parameters.

Keywords: diode laser, hair removal

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When it comes to removing unwanted hair, there are options ranging from temporary methods such as plucking/epilation, waxing, depilation, shaving, bleaching, pharmacologic options to laser, intense pulse light, home-use laser/light-based devices and electrolysis [1]. This paper will discuss three common modalities for hair reduction using photoepilation therapies which utilize selective photothermolysis i.e. Neodymium-doped yttrium aluminum garnet (Nd:YAG), Diode and Intense pulsed light (IPL).

Long-pulsed Nd-YAG lasers operate in the infrared region of the spectrum with a wavelength of 1064 nm thus the side effects are related to heat. Usually, a pretreatment topical anesthetic cream and post treatment cooling cream will be provided to minimize discomfort in the patients. This treatment works well for all skin types (I to VI) especially in those with darkly pigmented skin. Other than that, it can be used in patients with pseudofolliculitis barbae in particular. The possible side effects include pain and folliculitis [2,3].

Diode lasers use a specific wavelength of light which is 810 nm and at the same time cool down the skin to protect its surface. The hair is destroyed and completely removed when the melanin within the hair bulb in the targeted tissue selectively absorbs the wavelength of laser light, causing the hair follicles to gradually shrink. It is used for those with Fitzpatrick skin types I to V and particularly good options for darker skin types. The possible side effects with diode laser treatment include pain and folliculitis [2,3,4].

IPL is less expensive and uses a broad spectrum of light with many wavelengths in the range of 500 to 1200 nm. It may not be as effective as the laser system as there is less selective absorption from the unfocused energy in the follicle hence require more regular and long-term treatments. It can be applied for individuals with Fitzpatrick skin types I to IV [2,3].

Laser or IPL therapy is the most suitable choice for those who wish to remove hair in a wide area with dense hair growth. However, total removal of hair with a single laser hair-removal system therapy is uncommon. Furthermore, successful hair removal therapy with laser is likely to be affected by the combination of skin type, anatomic location, hair color, hormonal factors, stage of follicle growth cycle, and the diameter of the hair shaft [2,5]. According to Fitzpatrick skin types, there are 7 types of skin which are type I - always burns, never tans; type II - always burns, sometimes tans; type III - sometimes burns, always tans; type IV - rarely burns, always tans; type V - moderately pigmented; type VI - darkly pigmented [2]. Side effects due to laser hair removal such as transient erythema, perifollicular edema, pain, folliculitis, hyper-pigmentation, hypopigmentation, crusting, purpura, erosions and scarring are possible [6].

Case Presentation

A 35 years old Chinese lady with no known medical illness, came into the clinic on 20th March 2022 requesting for a hair removal procedure over the leg. Upon further inquiry, the patient has been shaving regularly for the past 20 years since teenage years. On examination, it was noted that she has hyperpigmented skin over the anterior part of both legs. Diode laser therapy over the course of 3 to 4 sessions was suggested for her. Before each session, she was advised to shave the targeted area 24 to 48 hours before treatment and avoid using any cream or lotion and sun exposure. At the end of each session, she was advised to avoid sun exposure and use sunscreen, exfoliate the treated area to avoid ingrown hair and to use gel, ice pack or aloe vera in case of discomfort caused by the heat during treatment session. Table 1 shows the laser parameter used during each session of the

Table 1 Diode laser parameter used on the patient.

Treatment sessions	Area selected	Fitzpatrick scale	Color of hair	Density of hair	Energy Density (J/cm ²)	Frequency (Hz)	Pulse width (ms)
Day 0	Leg	III	Black	Medium	45	5	26
Day 30	Leg	III	Black	Medium	45	4	32
Day 60	Leg	III	Black	Medium	45	4	32
Day 90	Leg	III	Black	Medium	45	3	42

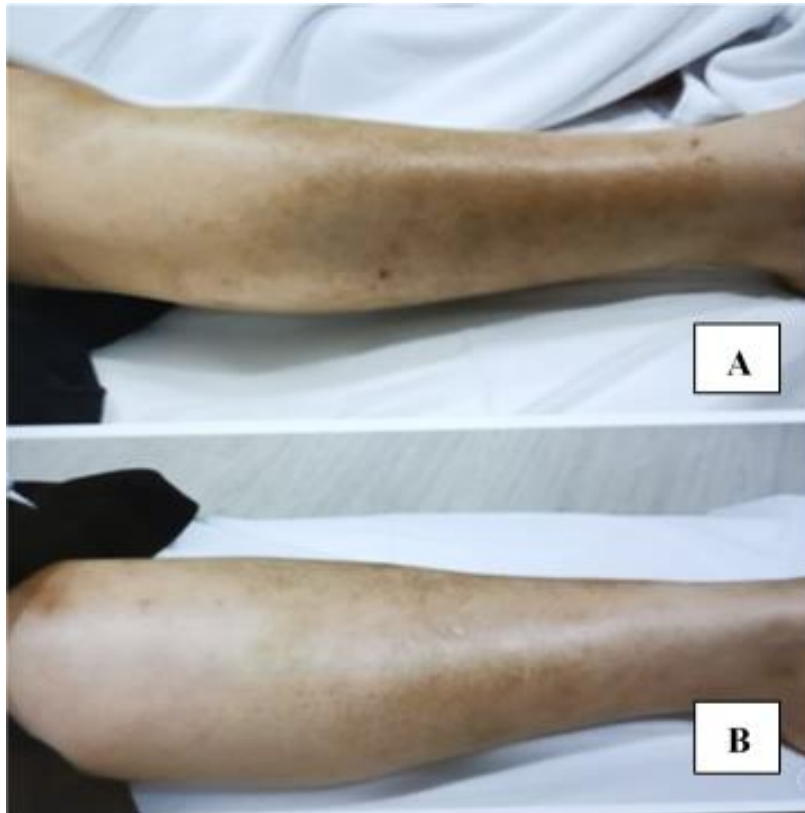


Figure 1 A: Before diode laser treatment, B: After 4 session of diode laser treatment

treatment. After all the sessions were completed (3 months), upon examination a noticeable hair reduction was found followed by depigmentation over the shin area (Figure 1).

Discussion

Diode laser is operated based on the principle of selective photothermolysis [7]. It emits light beams with a certain wavelength which then subjects the chromophore (targets), specifically melanin that is located in the shaft of our hair follicle and hair bulb to destruction. Through this technology, diode lasers of longer wavelength (800-810nm) are absorbed by the chromophore, subsequently causing thermally mediated injury and destruction of the hair follicle and hair bulb. Permanent hair removal and prevention of future hair regrowth can be achieved with repeat sessions using diode laser [8, 9].

Based on available literature, diode laser has been the gold standard of laser hair removal in recent years due to its suitability and safety for all skin types according to Fitzpatrick skin scale [8, 10]. It is also a preferred method for hair removal due to less immediate pain compared to other lasers such as Nd:YAG [3]. Diode lasers with a wavelength of 810 have been proven to be safe and produce less side effects, hence better tolerated by darker skin types. Maximal efficacy and safety of diode laser can be achieved by maintaining low fluence and high repetition rate [8, 11]. Apart from that, diode laser is also effective in removing thick coarse hair, which is why it is a popular option among men for removing chest hair and back hair [7]. Different studies have shown that diode laser is able to provide long term hair reduction with just 3 to 4 sessions and up to 84-85% hair reduction after 12 months post-procedure [3].

Other traditional hair removal often results in pain and side effects especially to darker and tanned skin types. This is especially true for lasers involving high energy, which is often

painful and causes hypopigmentation with post-inflammatory hyperpigmentation. However, with the latest diode laser technology involving low level fluence, high repetition rate and using technique of multiple passes in constant motion, better outcome and high efficacy has been proven amongst Fitzpatrick type I-V patients with significant reduction in hair count after multiple treatment [1]. Below is the list of important things to consider before diode laser treatment [10].

- Stop plucking and waxing - Laser hair removal works by targeting the roots of the hair, so it's essential that patients don't pluck or wax the treated area at least four to six weeks prior to your first appointment.
- Shave the area - Shaving it 24 to 48 hours prior to appointment is essential. Even though hair is invisible to the naked eye, the laser is still able to target the pigment located in the hair's root as it decreases the chance of burns with the hair being below the skin's surface.
- Avoid sun exposure - For two weeks prior to laser hair removal, it's important that the skin being treated is kept out of the sun. This includes both tanning beds and self-tanners. As it may lead to skin discoloration after your laser treatment and also pain and blistering. Be sure to use sunscreen daily if the treated area can't be covered while outside.
- Put down the bleach - Bleaching should be stopped six weeks prior to laser hair removal treatment, which is enough time for the hair roots to grow back in their natural color.
- Check patient medications - Some medications can intervene with laser treatments, making them less effective while some can make the skin sensitive and more likely to burn or blister.
- Remove makeup or creams

The possible side effects of diode laser are redness, skin irritation, erythema, postoperative

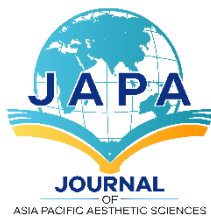
hypersensitivity and possible burns and hyperpigmentation [12].

Conclusion

Total removal of hair with a single laser hair-removal system is uncommon. Successful laser hair removal is affected by several factors such as the combination of skin type, anatomic location, hair color, hormonal factors, stage of follicle growth cycle, and the diameter of the hair shaft.

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Treatment Regime of Acne Vulgaris - Psychological Consequences: A Case ReportZahra bt Zaki^{1*}, Tivyapprasanthni A/P Manivasagam², Tan Ying Qi³, Ling Yi Lin⁴, Ong Kah Keat⁵¹Hospital Umum Sarawak²Hospital Seberang Jaya³Hospital Pulau Pinang⁴W Clinic, Butterworth⁵IG Clinic, Butterworth**Abstract**

Acne vulgaris is a common dermatology disorder affecting adolescent with potential for profound psychosocial morbidity. There is high prevalence rate of depression and anxiety among patients with acne. In this case, an 18-year-old gentleman diagnosed to have acne vulgaris with the severity of CASS 4 was initially treated with isotretinoin. Unfortunately, post initiation of isotretinoin, he suffered from depressive symptoms that resulted in early termination of isotretinoin. Although he was able to recover from his depressive symptoms after the termination of isotretinoin, he was unable to tolerate topical benzoyl peroxide (BPO) 5% and had to be admitted for intravenous antibiotics and steroid. Therefore, despite isotretinoin being the most efficacious in treatment of severe acne, conflicting results of its association with depression still require more controlled trials to clarify. In this case, it is highlighted that even a low dose isotretinoin might cause significant psychological impact that warranted more caution in treatment of acne.

Keywords: Acne vulgaris, Depression, Isotretinoin

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Acne vulgaris is an inflammatory disorder of the pilosebaceous unit, which is self-limiting but runs a chronic course. It is known to be caused by follicular epidermal hyperproliferation, excess sebum production, the presence of the commensal bacteria *Propionibacterium acnes* and inflammation [1]. Acne vulgaris is triggered by *P. acnes* in adolescence, under the influence of normal circulating dehydroepiandrosterone (DHEA) [2]. It usually presents with inflammatory and non-inflammatory lesions primarily on the face but may also occur on the upper arms, trunk and back [3-5]. There are many approaches and treatments for acne vulgaris. This case report focuses on a young gentleman who presented with severe acne vulgaris CASS 4 and was initially treated with Oral Isotretinoin. However, his overall condition worsened and subsequently required admission to the hospital for further management.

Case Presentation

This is a case of an 18-year-old gentleman who was diagnosed with severe acne vulgaris CASS 4 (Figure 1) and has been under Dermatology Clinic follow up since early September 2022. He first presented with acneiform eruption with pustules and nodules requiring the initiation of oral isotretinoin 20 mg EOD. After 2 doses of isotretinoin, he began to develop low mood and loss of appetite which was suggestive of depressive symptoms. He noted that those symptoms improved with cessation of the medication for two days. However, his skin lesions worsened with worsening pustule formation as well as swelling over his acne nodules and these were associated with severe pain (PS: 9/10). He was unable to tolerate topical benzoyl peroxide (BPO) 5% due to the burning sensation. On examination, there was multiple pustular cystic lesion and inflamed papules over face and trunk (CASS 5). His blood investigation showed high white blood cells count (WBC: 22).

Management and outcome

This patient was then admitted to the hospital and was started on intravenous (IV)

Hydrocortisone 50 mg, IV Cefuroxime 750 mg, and normal saline dabs three times daily for each treatment. After a few days on antibiotics, his symptoms improved and his white blood cell count was reduced in trend. Subsequently, he was discharged with Tab Doxycycline 100mg once daily till present. His overall condition improved from CASS 5 to CASS 3.

Discussion

Acne vulgaris is a prevalent dermatological problem nationally and it undoubtedly affects the patient cosmetically, psychologically, and socially [6]. Acne may appear in adolescence and persists through the early thirties. The Global Burden of Disease Project estimates the prevalence of acne at 9.4%, ranking it as the eighth most prevalent disease worldwide with higher rates reported in developed countries [6-8]. It is more common in males than in females and studies have shown that urban population are more affected than the rural population. About 20% of the affected individuals develop severe acne, which results in scarring. Some races appear to be more affected than others for example Asians and Africans tend to develop severe acne, but mild acne is more common in the white population. Research in the US has shown that 85% of people between the ages of 12 and 24 years have acne, and while it is most common in teenagers, acne affects 8% of adults aged 25 to 34 years, and 3% of adults aged 35 to 44 years [6].

There are several factors that leads to the formation of acne. Firstly, during puberty there is increased production of sebum regulated by androgens. High level of androgens may cause overstimulation of sebaceous glands and subsequently increased hyperproliferation of follicular epidermis, hence there is retention of sebum. The glands may also be stimulated from hypersensitivity of the normal level androgens which are testosterone, dehydroepiandrosterone sulfate (DHEAS) and dihydrotestosterone (DHT). Secondly,



Figure 1A, 1B, 1C: Photographic image: Day 1 before started on treatment.

overproduction of normal pilosebaceous flora, *P. acne* may lead to inflammation of the glands. *P. acne* releases enzymes such as proteinase, lipases and hyaluronidases that causes the breakdown of sebum to free fatty acids, peptides and chemotactic factors which are integral to inflammatory cascade. The inflammatory response to the bacterium and metabolic by-products leads to the formation of papules, pustules, and nodules. Moreover, altered follicular keratinisation causes accumulation of cells and sebum which leads to the formation of microcomedones (microscopic precursor of acne lesion) [9].

This patient was started on oral isotretinoin in view of his initial presentation of CASS 4 (numerous pustules and papule with few nodules and cyst). Isotretinoin is highly effective for treatment of acne. It is an isomer of the active form of vitamin A and retinoids. It acts on the sebaceous gland by decreasing the size thus reduces sebum production. Apart from that, it normalizes follicular keratinization and indirectly inhibits *P. Acnes* growth in hair follicle and exerts an anti-inflammatory action. Basically, it inhibits formation of acne from every aspect of pathophysiology. Oral isotretinoin usually started with 0.5-1mg/kg/day with average maximum 1.2 mg/kg/day. Incidence of relapse is higher in patient started on low dose of isotretinoin. On the other hand, rate of relapsed is lower for patient that have

cumulative dosage of 120mg/kg. On average, patient will have remission for period of 38 months after completed one course.

However, the patient of interest started to develop the side effect - low mood and loss of appetite. Based on studies, there was no clear relationship between use of isotretinoin and depression. However, in a small number of patients it may be associated with symptoms of major depressive episode. In these group of patients, their symptoms will resolve rapidly (within a week) once the medication is discontinued however some may persist. Based on a study by Bremner⁷, there is evidence that isotretinoin alters brain function and it is consistent with depression and mood changes via direct imaging studies. Apart from physiological complication, isotretinoin commonly causes dry mucosa, xerosis with pruritus, cheilitis and elevated liver function test.

After that, topical benzoyl peroxide (BPO) 5% treatment was given to the patient. However, the patient was unable to tolerate it due to the burning sensation cause by the treatment. BPO is an anti-bactericidal, keratolytic and anti-inflammatory agent available in various concentrations includes 2.5%, 5% and 10%. Patient will develop adverse effect with the use of BPO in 10% concentration.

In view of his worsening condition with signs of inflammation and increase in white blood cell parameter, he was admitted and started on IV hydrocortisone and cefuroxime. Subsequently, oral Tab Doxycycline 100 mg OD was given to the patient. Oral antibiotics have been widely used for moderate to severe acne vulgaris as they have anti-*P. acne* properties which prevents further inflammation. Oral antibiotics should not be prescribed continuously for more than 6 months as prolonged use may be associated with bacterial resistance [10].

Furthermore, some aesthetic procedures could also be helpful for this patient. Chemical peels include glycolic acid and salicylic acid have desquamating properties which reduces corneocyte cohesion and keratinocyte plugging, which act as adjuvant in treatment of facial acne [10]. Phototherapy including pulsed dye laser, potassium titanic phosphate (KTP) laser, infrared diode laser, intense pulse light (IPL) and visible light sources, and photodynamic therapy leads to photo thermal heating of sebaceous glands and photochemical inactivation of *P. acnes*, may be used as an alternative therapeutic option for patients who fail or unable to tolerate other standard acne therapies [10].

Conclusion

In conclusion, treatment for acne vulgaris can be divided into topical and systemic. Topical treatments are mainly suitable for mild to moderate acne. In the case of severe acne, isotretinoin may be superior in comparison to other drugs. However, it is not suitable for every patient due to the adverse effects. Further clinical studies are required to establish the relationship between isotretinoin and depressive symptoms. For patient with moderate to severe acne, the treatment should start with oral antibiotics to prevent further inflammation.

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