DERMATOLOGICA SINICA 35 (2017) 119–123

Contents lists available at ScienceDirect

Dermatologica Sinica

journal homepage: http://www.derm-sinica.com

ORIGINAL ARTICLE

Using pulsed dye laser to treat sebaceous hyperplasia: comparison of short and long pulse-duration pulsed dye laser

Sheng-Pei Wang [1], Ying-Jui Chang [1,2], Ching-Chi Chi [3,4], Shu-Hui Wang [1,*], Tsung-Hua Tsai [5,*]

[1] Department of Dermatology, Far Eastern Memorial Hospital, New Taipei, Taiwan
[2] New Taipei Institute of Dermatology, New Taipei, Taiwan
[3] Department of Dermatology, Chang Gung Memorial Hospital, Linkou, Taoyuan, Taiwan
[4] College of Medicine, Chang Gung University, Taoyuan, Taiwan
[5] Ferrari Skin and Hair Clinic, Taipei, Taiwan

ARTICLE INFO

Article history:
Received: Sep 13, 2016
Revised: Mar 8, 2017
Accepted: Mar 25, 2017

Keywords:
long pulse-duration pulsed dye laser
sebaceous hyperplasia
short pulse-duration pulsed dye laser

ABSTRACT

Background: Pulsed dye laser (PDL) is effective in treating sebaceous hyperplasia (SH). However, only short pulse-duration PDL (SPDL) has been used in previous studies.
Objectives: To determine whether long pulse-duration PDL (LPDL) can achieve comparable efficacy in treating SH with fewer side effects versus SPDL.
Methods: Eight patients with a total of 75 SH lesions were enrolled. Each SH lesion was randomized to be treated with two sessions of 595-nm SPDL with 0.45-millisecond pulse duration or 595-nm LPDL with 20-millisecond pulse duration. The second session was performed 4 weeks after the first session. Side effects including pain and post-treatment purpura were recorded. Follow-up examinations were conducted at 1 week and 4 weeks after the first session, and at 1 week, 4 weeks, and 8 weeks after the second session for repeated photography and assessing the diameter and thickness of each lesion, post-treatment purpura, and other adverse events.
Results: All SH lesions responded to two sessions of PDL treatments. The reduction ratio of lesion diameter was 76.3% in the SPDL group and 70.0% in the LPDL group after two sessions of treatments ($p = 0.644$). The reduction ratio of lesion thickness was 79.6% in the SPDL group and 72.7% in the LPDL group after two sessions of treatment ($p = 0.187$). The mean intensity of pain was 3.13 on a 0–10-point scale for SPDL and 3.60 for LPDL ($p = 0.660$). The intensity of immediate post-treatment purpura was 4.13 on a 0–5-point scale for SPDL, and 1.80 for LPDL ($p < 0.001$). Some of the lesions treated by SPDL underwent an erosive stage. No scarring or discoloration was noted at 8 weeks after treatment.
Conclusions: While SPDL and LPDL have comparable efficacy in treating SH after two sessions of treatment, LPDL can provide a shorter and aesthetically better recovery time.

Introduction

Sebaceous hyperplasia (SH) is a common skin disorder. It may present at any age, but most often develops after 40–50 years of age with an increasing prevalence over time.[1] A study on 286 people with a mean age of 82 years found that the prevalence of SH was 26%.[1] Senile SH, the most common variant, is featured by yellowish or skin-colored papules that locate most often on the face, although other nonfacial sites, including the scrotum and chest, have been reported.[2,3] Patients of SH usually seek treatment due to cosmetic concern, especially when the lesions are located on the central face or when the number

Conflicts of interest: The consumption, equipment, and manpower related to this study were partially supported by Syneron Candela Corporation, Wayland, MA, USA and Dynamic Medical Technologies Incorporation, Taipei, Taiwan.

* Corresponding authors. Department of Dermatology, Far Eastern Memorial Hospital, No. 21, Sec. 2, Nan-Ya South Road, Banqiao District, New Taipei City 220, Taiwan (Shu-Hui Wang); Ferrari Skin and Hair Clinic, 2F., No. 135, Sec. 5, Zhongxiao E. Rd., Xinyi Dist., Taipei City 110, Taiwan (Tsung-Hua Tsai).
E-mail addresses: dermawang@hotmail.com (S.-H. Wang), skinhairdoctor@gmail.com (T.-H. Tsai).

http://dx.doi.org/10.1016/j.dsi.2017.03.004

and size of the lesions are large. A few nonsurgical ablative devices are effective in treating SH, including electrodessication, carbon dioxide laser and erbium-doped yttrium aluminium garnet (Er:YAG) laser.[4,5] However, these options bear the considerable risk of intra- and postoperative bleeding, discoloration, and scar formation.[6] Oral isotretinoin has been used in treating SH in Muir–Torre syndrome and familial SH, but has a high relapse rate with discontinuation and is a known teratogen in pregnancy.[7] Photodynamic therapy has been reported to be effective, but the procedure is painful, expensive, and time-consuming.[8,9]

Pulsed dye laser (PDL) has been successfully used to treat vascular lesions for the past 25 years. It is regarded as the standard treatment for vascular malformations, such as port wine stain,[10] and is also effective in treating rosacea, refractory warts, and unilateral nevoid telangiectasia by targeting telangiectasia and feeding vessels of the lesions.[11–13] One drawback of traditional short pulse-duration PDL (SPDL) using a pulse duration of 0.45 milliseconds is the development of prominent purpura immediately after treatment. The purpura over the treated area lasts for 1–3 weeks. Moreover, after the fading of the purpura, post-inflammatory hyperpigmentation may develop following hemosiderin deposition. However, the long pulse-duration PDL (LPDL) utilized more pulselets spread over longer pulse duration, resulting in immediate blanching of the treated vessels without purpura and post-inflammatory hyperpigmentation.[14] In addition to reduced side effects, the LPDL was shown to have superior efficacy in treating thick linear telangiectasia on the nasal ala and nasolabial fold than SPDL.[15]

PDL has been documented to be an effective treatment for SH in several case reports.[6,16,17] The vascular nature of SH and its response to PDL were also demonstrated by utilizing *in vivo* confocal microscopy, showing that the sebaceous gland lobules were circumscribed within the vascular envelope, and the selective photothermal damage was confined to these vessels immediately after PDL treatment.[17,18] However, only SPDL has been used in these reported cases of SH treatment. No study has utilized LPDL to treat SH. We aimed to conduct the first study to compare the efficacy and adverse effects of SPDL and LPDL in treating SH, and to determine whether LPDL could achieve comparable efficacy with fewer side effects versus SPDL.

Materials and methods

Ethical approval

The study has been approved by the Research Ethics Review Committee of the Far Eastern Memorial Hospital. All participants gave signed informed consent.

Inclusion and exclusion criteria

Patients with SH were recruited from our outpatient clinic. The inclusion criteria were to have at least two SH lesions on the face. The exclusion criteria were patients with known history of keloid and coagulation disorders. Women who were pregnant and preparing for pregnancy were also excluded.

Study design

Pretreatment evaluation encompassed a relevant history, examination of the facial skin, and evaluation of the diameter and thickness of each SH lesion. The thickness of each SH lesion was defined as the height above the adjacent nonlesional skin surface. High-resolution photographs were taken using a digital camera under the same light setting.

Each patient received split-face randomized treatment. The SH lesions on one side of the face were randomly allocated to treatment with two sessions of 595-nm SPDL with 0.45-millisecond pulse duration, 5-mm spot size, 3–5 stacking pulses, and 9–11 J/cm^2 fluence (VBeamII Perfecta; Candela, Wayland, MA, USA), and the other side to two sessions of 595-nm LPDL with 20-millisecond pulse duration, 5-mm spot size, 3–5 stacking pulses and 13–21 J/cm^2 fluence (VBeamII Perfecta). The fluence applied on each patient was determined by the level of fluence that could cause immediate post-treatment erythema or purpura on the treated sites. Once the immediate post-treatment erythema or purpura developed, no further augmentation of fluence was done. Postoperatively, patients applied tetracycline ointment daily until healing was complete.

No topical anesthetic creams were allowed before PDL treatment. Pain resulting from each laser therapy was rated by each patient and post-treatment purpura was evaluated by the investigator immediately after treatment. Follow-up examinations were conducted at 1 week and 4 weeks after the first session for repeated photography, and assessing the diameter and thickness of each treated lesion, post-treatment purpura, and other adverse events. The second session was conducted 4 weeks after the first session, with the same type of PDL therapy as the first session, on each lesion. Follow-up examinations for the outcomes described above were conducted immediately, and at 1 week, 4 weeks, and 8 weeks after the second session.

Treatment response rate

Treatment responses were categorized into complete reduction, partial reduction, and nonreduction (0% reduction) of the treated lesion. Treatment response rate of each laser therapy was calculated.

Reduction ratio of lesion diameter and thickness

The reduction ratio of lesion diameter was calculated by decrease in diameter after treatment divided by initial diameter of the same SH lesion. The reduction ratio of lesion thickness was also calculated.

Pain

Patients were asked to rate the pain resulting from each PDL therapy on a 0–10 scale immediately after treatment.

Post-treatment purpura

An investigator rated the post-treatment purpura immediately, and at 1 week, 4 weeks, and 8 weeks after treatment on a scale of 0–5, with 5 referring to very severe purpura.

Statistical analysis

Mean values with 95% confidence interval (CI) and percentages were used to present continuous variables and categorical variables, respectively. Wilcoxon rank sum test (Mann–Whitney test) was used to analyze the continuous data. The level of statistical significance was defined as $p < 0.05$. The software used for statistical analyses was GraphPad Prism (version 6.0; GraphPad Software, La Jolla, CA, USA).

Results

Eight patients with SH lesions were enrolled in the study after obtaining informed consent. They included six men and two women aged from 38 years to 71 years, with Fitzpatrick skin Type III or IV. Two to 24 SH lesions were found on each patient, resulting in