



Treatment of recalcitrant port-wine stains (PWS) using a combined pulsed dye laser (PDL) and radiofrequency (RF) energy device

Yoon-Soo Cindy Bae, MD,^{a,b} Hamad Alabdulrazzaq, MD,^b Jeremy A. Brauer, MD,^{a,b}
and Roy G. Geronemus, MD^{a,b}
New York, New York

Background: Pulsed dye laser (PDL) is the treatment of choice for port-wine stains (PWS). Some PWS are recalcitrant to this modality. A number of reasons for PDL treatment resistance have been described, including inadequate heat generation.

Objective: We evaluated PDL combined with radiofrequency (RF) energy into a single device to target larger and deeper blood vessels and overcome PDL resistance.

Method: This was an open-label, prospective, single-center investigation of a novel device combining RF energy with PDL conducted to treat recalcitrant PWS. Ten patients with 11 recalcitrant PWS were enrolled. Each PWS was divided into 5 treatment areas: PDL alone, RF alone, PDL+RF, RF+PDL, and untreated control. Patients underwent a maximum of 6 treatments, scheduled 4 to 6 weeks apart with follow-up evaluation at 4 and 12 weeks after the final treatment. Colorimetry and standardized digital photography were performed at all visits. Lesional biopsy specimens were collected for selected patients.

Results: Areas treated with RF followed by PDL and PDL followed by RF showed the greatest improvement based on blinded review of digital photographs, reaching statistical significance (P value $< .05$) at the 12-week follow-up evaluation when compared with baseline. Adverse events, including purpura, erythema, edema, scabbing, crusting, and blistering, resolved without sequelae; a small residual scar was noted in 1 patient.

Limitations: Small sample size and short follow-up period are limitations.

Conclusion: Combined RF/PDL technology is promising for the treatment of recalcitrant PWS. (J Am Acad Dermatol 2017;76:321-6.)

Key words: cutaneous laser; pulsed dye laser; radiofrequency; recalcitrant port-wine stains.

Although pulsed dye laser (PDL) treatment for port-wine stains (PWS) has evolved, response remains variable and unpredictable. In a study evaluating 100 patients with PWS from infancy to 31 year of age, no patient achieved

Abbreviations used:

PDL: pulsed dye laser
PWS: port-wine stain
RF: radiofrequency

From the Ronald O. Perelman Department of Dermatology, New York University Langone Medical Center,^a and Laser and Skin Surgery Center of New York.^b

This work was made possible by an equipment loan from Syneron/Candela.

Disclosure: Dr Bae is on the medical advisory board for Allergan and Merz, and is a consultant for Allergan, BioSpecifics, Merz, Galderma, and Cynosure/Palomar. Dr Brauer is a consultant with Miramar and received honoraria from Cynosure/Palomar. Dr Geronemus received honoraria from Cynosure/Palomar; owns stock or stock options for Zeltiq and OnLight Sciences; and sits on medical advisory boards for Zeltiq, Syneron/Candela, and

Cynosure/Palomar. Dr Alabdulrazzaq has no conflicts of interest to declare.

Presented at the Late-Breaking Research in Dermatology Forums during the American Academy of Dermatology 73rd Annual Meeting, San Francisco, CA, March 20, 2015.

Accepted for publication March 1, 2016.

Reprints not available from the authors.

Correspondence to: Yoon-Soo Cindy Bae, MD, Laser and Skin Surgery Center of New York, 317 E 34 St, New York, NY 10016.

E-mail: yoonsoobae@yahoo.com.

0190-9622/\$36.00

© 2016 by the American Academy of Dermatology, Inc.

<http://dx.doi.org/10.1016/j.jaad.2016.03.004>

100% clearing after 5 PDL treatments and the average reduction was 40%.¹ This differs from studies reporting 90% clearing among infants with PWS.² An investigation of 74 adults reported no patient with 100% clearance after at least 8 treatments.³ A long-term study following 640 patients with PWS failed to demonstrate more than 50% clearance after 8 to 12 treatments.⁴

Savas et al⁵ summarized factors contributing to PDL-resistant PWS. These include age (>1 year old), size of lesion (>40 cm²), anatomic location (central aspect of the face), skin thickness (hypertrophic or nodular PWS), vessel depth (>400 μm), vessel diameter (<20 μm), and number of treatments (>5).⁵ Histopathologic studies of PWS responding poorly to PDL revealed large PWS vessels (>150 μm), leading authors to theorize that inadequate heat generation in these vessels may be an additional factor responsible for poor response.⁶

To counteract a lack of heat production to photocoagulate larger blood vessels, bipolar radiofrequency (RF) energy was used to prime the PWS immediately prior to PDL with the goal of increasing the skin temperature by 10 to 15°C.⁷

METHODS

A prospective, controlled study of adult patients, each with a PWS of at least 50 cm², was performed. The study was approved by the Essex Institutional Review Board and participants provided written informed consent. Patients with Fitzpatrick skin types I to IV with PWS on the head, neck, trunk, upper aspect of arms, or upper aspect of legs were enrolled. Those with an active electrical implant anywhere in the body or a permanent implant in the treated area were excluded from the study, as were those with PWS treatment within the previous 6 months. Pregnant or breast-feeding women were excluded. Photographs were taken of the PWS area using standardized photography (same camera with consistent lighting, position, and distance from camera lens) before treatment, immediately after treatment, and 1 and 3 months after treatment.

Each PWS was divided into five 2- × 2-cm² segments, each segment assigned to one of the following treatments: RF/PDL, PDL/RF, RF alone, PDL alone, and control. For both RF/PDL

and PDL/RF, the RF and PDL energy pulses overlapped in time, but because the PDL pulse is much shorter than the RF pulse, the PDL was delivered within the last 50 milliseconds of the RF pulse for RF/PDL, and within the first 50 milliseconds of the RF pulse for PDL/RF (RF pulse duration is approximately 300 milliseconds). Each treatment

segment was measured using a colorimeter at baseline and every subsequent visit, to quantify the degree of blanching. Each patient was treated up to 6 times at monthly intervals. PDL treatment settings included fluences ranging from 6.5 to 9 J/cm², with a 40-millisecond cryogen spray followed by a 20-millisecond delay, and 1.5-millisecond long PDL pulse, using a 10-mm spot size. The PDL energy was delivered

between two 12-mm-long ceramic capped electrodes with a 12-mm gap. Bipolar RF treatments consisted of a consistent energy delivery of 40 J. A hydrating ultrasound gel was applied to the area before treatment to improve RF coupling to skin.

Patient and investigator satisfaction surveys were collected throughout the study where satisfaction was rated using a 5-point scale: 0 = not satisfied, 1 = slightly satisfied, 2 = moderately satisfied, 3 = satisfied, and 4 = very satisfied. Lastly, a blinded investigator 5-point improvement scale was used: 0 = no response or 0% clearance; 1 = slight response or less than 25% clearance; 2 = moderate response or 25% to 49% clearance; 3 = good response or 50% to 74% clearance; and 4 = very good response or 75% to 100% clearance. Patients and blinded investigators used the same 5-point improvement and satisfaction scales.

At each treatment visit, the following parameters were evaluated immediately after treatment: erythema, edema, purpura, blistering, scabbing/crusting, ulceration, scarring, and pigmentation. A blinded investigator evaluated photographs of each treated area at the end of the study. Purpura was the clinical end point; changes in fluence as the treatments progressed varied from 0.5 to 1.0 J/cm².

Skin biopsy specimens (3 mm) from each treatment segment were obtained immediately after treatment from 3 volunteers. Vascular changes were evaluated by a dermatopathologist and included: depth of vascular injury, vessel number, vessel diameter.

CAPSULE SUMMARY

- Port-wine stains may be resistant to pulsed dye laser therapy.
- Radiofrequency technology combined with pulsed dye laser showed promise for treating a subset of adult port-wine stains unresponsive to treatment with the pulsed dye laser alone.
- Recalcitrant port-wine stains may benefit from study of potential new treatment modalities.

Download English Version:

<https://daneshyari.com/en/article/5648458>

Download Persian Version:

<https://daneshyari.com/article/5648458>

[Daneshyari.com](https://daneshyari.com)