

Anatomical Evaluation for Successful Dye Laser Treatment of Port Wine Stain in Vietnamese Patients

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Abstract

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AIM: To assess the efficacy in the treatment of port wine stain in the head and neck by using (Vbeam perfecta®).

METHODS: Forty-two port wine stain patients were recruited at the National Hospital of Dermatology and Venereology, Hanoi, Vietnam.

RESULTS: We reported an excellent response (43.8%) (76%-100% lightening), a good response (18.8%) (51%-75% lightening), fair improvement (18.8%) (26%-50% lightening), and no response (18.8%) (0%-25% lightening).

CONCLUSION: In conclusion, pulsed dye laser is an excellent technique to remove port wine stains on the face and neck.

Introduction

Port wine stain (PWS) is also called capillary malformation or nevus flammeus. PWS occurs in 0.1 – 0.2% of newborns in the world, but there are no reports about the frequency in the Vietnamese population. PWS appears at birth as a pale pink to red well-defined patches and grows in size commensurate with patient's growth. They are typically seen in the head and neck area although they can occur anywhere on the skin and mucous membrane. If not treated, the disease can be disfigured in adults, with papular nodules on the PWS surface. As the patient aged, the colour changes from pink to red to purple

from childhood to adulthood, and this appears to be correlated with the wider vessel in older patients.

Pulsed dye laser (PDL) is considered one of the possible therapeutic choices for the treatment of vascular malformations and PWS [1].

Material and Methods

In this study, we assess the utility of using pulsed dye laser (Vbeam perfecta®) in the treatment of forty-two Vietnamese patients with congenital PWS

at the National Hospital of Dermatology & Venereology, from 2011 to 2014.

Every patient had 4 test patches with different fluences (11; 11.5; 12; and 12.5 J/cm²), but the same pulse duration (1.5 mms) and spot size (7 mm). After 8 weeks, the test area showed the best response was used as the set up for the next treatment. The results were evaluated by comparing pre and post photographs taken before and after each treatment using the Physician Global Assessment.

Results

Patients older than 18 years old achieved a better outcome than less than 18-year-old-patients (30% vs 18.2%, respectively) as shown in Table 1.



Figure 1: PWS under the chin

We found that there were no differences in responding rates according to age (≥ 19 -year-old vs ≤ 18 -year-old), $p > 0.05$.



Figure 2: After 3 times treatment by using Vbeam perfecta

In our study, patients having purple or red plaques showed greater improvement than pink plaques (91.7% and 87.5% response rate compared to 50%, respectively) as presented in Table 1.

Table 1: Correlation between results with age and some lesion's manifestations

Results of treatment Features	Respond rate to treatment		p	
	Respond rate	No, respond rate		
Age	≤ 18 years old	70.0%	30.0%	0.369
	> 18 years old	81.8%	18.2%	
Color	Purple	91.7%	8.3%	0.018
	Red	87.5%	12.5%	
	Pink	50.0%	50.0%	
Size	< 20 cm ²	75.0%	25.0%	0.560
	≥ 20 cm ²	78.6%	21.4%	
Surface	Flat	69.7%	30.3%	0.058
	Elevated	100%	0%	

Regarding the lesion size, there was no statistical difference between lesions with greater or smaller 20 cm², $p > 0.005$ (as shown in Table 1).



Figure 3: PWS on the cheek, and neck

All patients had elevated surface (hypertrophic) lesions respond to treatment, while only 69.7% of patients with flat surface lesion responded to treatment, as presented in Table 1. However, this difference is not different statistically, but we would need a larger sample size to confirm this conclusion.



Figure 4: After 10 times treatment

We also analysed the anatomical distribution of the lesion and found that perioral regions including the lips had the highest rate of failure (Table 2).

Table 2: Correlation between results with lesion's distribution

Results/Distribution	Respond		No respond		Total
	Patients	Percentage (%)	Patients	Percentage (%)	
Cheeks	24	72.7	9	27.3	33
Perioral	8	61.5	5	38.5	13
Neck	8	100	0	0	8
Periorbital	4	80	1	20	5
Chin	3	100	0	0	3
Forehead	2	100	0	0	2
Nose	1	100	0	0	1
Ears	1	100	0	0	1

Discussion

Our study did not support the theory that PWS should be treated as soon as possible, to avoid developing hypertrophic and nodular lesions at middle age [2], [3]. The reason explains why PWS on the neck is improving better than lip and cheek is that neck skin is thinner than cheek and lip skin, by Richard et al., [4].

Red or purple PWS has superficial location whereas pink PWS, due to the small vessel size and deeper location, predict a poor response [4], [5]. Our study was in support of this theory.

The side effects as hyperpigmentation, hypopigmentation, blistering and crusting were not severe and improved with times, in according to other studies in the literature [6], [7], [8].

In conclusion, this is the first report of the utility of the 595 nm pulsed dye laser (Vbeam perfecta®) for PWS in Vietnamese patients,

confirming the efficacy in treatment without considerable side effects.

References

- Liang Y, Chen YL, Zhao MT, Wang ZY, Li L, Zhang B, Shen CP, Wang S, XU ZG, Ma L. Pediatric Dermatology-critical approach to the new treatments. *Dermatologic therapy*. 2018:e12801. <https://doi.org/10.1111/dth.12801> PMID:30537373
- Tan OT, Sherwood K, Gilchrest BA. Treatment of children with port-wine stains using the flashlamp-pulsed tunable dye laser. *New England journal of medicine*. 1989; 320(7):416-21. <https://doi.org/10.1056/NEJM198902163200702> PMID:2913507
- Garden JM, Burton CS, Geronemus R. Dye-laser treatment of children with port-wine stains. *New England Journal of Medicine*. 1989; 321(13):901-2. <https://doi.org/10.1056/NEJM198909283211313> PMID:2770828
- Kristen A. Richards, Jerome M. Garden. *Pulsed Dye Lasers. Principles and practices in cutaneous laser surgery*. Taylor & Francis, 2005:199 - 212.
- Li L, Kono T, Groff WF, Chan HH, Kitazawa Y, Nozaki M. Comparison study of a long-pulse pulsed dye laser and a long-pulse pulsed alexandrite laser in the treatment of port wine stains. *Journal of Cosmetic and Laser Therapy*. 2008; 10(1):12-5. <https://doi.org/10.1080/14764170701817023> PMID:18330793
- Seukeran DC, Collins P, Sheehan-Dare RA. Adverse reactions following pulsed tunable dye laser treatment of port wine stains in 701 patients. *British Journal of Dermatology*. 1997; 136(5):725-9. <https://doi.org/10.1111/j.1365-2133.1997.tb03659.x> PMID:9205506
- Laube S, Taibjee S, Lanigan SW. Treatment of resistant port wine stains with the V Beam® pulsed dye laser. *Lasers in surgery and medicine*. 2003; 33(5):282-7. <https://doi.org/10.1002/lsm.10234> PMID:14677155
- Grazzini M, Stanganelli I, Rossari S, Gori A, Oranges T, Longo AS, Lotti T, Bencini PL, De Giorgi V. Vascular skin lesions. *Dermatol Ther*. 2012; 25:297-303. <https://doi.org/10.1111/j.1529-8019.2012.01547.x> PMID:22950556