

THE USE OF 585nm FLASHLAMP-PUMPED PULSED DYE LASER TO TREAT PORT-WINE STAINS

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In the view of the available recommendation; I forward this case study for the debate by the examination committee.

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Abstract

Port-wine stains (PWSs) are congenital capillary malformations in skin. The incidence of PWSs is 0.3-0.5% in general population and the incidence is equal in males and females. PWSs are usually appearing at birth as pink flat and sharply demarcated macules. PWSs most commonly involve the head and neck (90%). The

commonest locations in the face are along the distribution of the branches of trigeminal nerve. Facial PWSs are prone to darken (pink at birth, red in childhood and purple in adults) and develop hypertrophic skin changes and nodularity by the age of 46. Single or multiple PWSs could appear in one or more than one anatomical areas. Patients with PWSs may also complain of psychological problems due to the cosmetic handicap, especially most PWSs occur on exposed body areas (head & neck). So the patients have difficulties in contact with the opposite sex, school relations, school contacts, self-esteem or clothes and makeup.

On microscopic examination, a port-wine stain is characterized by ecstastic capillary-to-venular sized channels within both papillary and upper reticular dermis. The vessels are thin walled and lined by flat mature endothelium with undetectable cellular turnover. The average depth of these ecstastic vessels is 0.46 mm. Using immunoperoxidase-staining techniques showed a decrease in perivascular nerve density. The neural deficit may be responsible for altered vascular tone and thus may contribute to the progressive ectasia seen in port-wine stains.

PWSs are considered as red flag, because PWSs may associate with other serious conditions as glaucoma and pial vascular malformations.

Port-wine stains have long presented a therapeutic challenge to physicians, so we find several modalities of treatment to improve the cosmetic appearance and decrease the psychological trauma of patients. The results are poor for the conventional methods as camouflage by white tattoos, and scarification by irradiation or freezing. Surgical excision is now used only for hypertrophied PWSs. cosmetics or certain hairstyles to cover facial PWSs are used till now when laser therapy is not available.

The standard flashlamp pumped pulsed dye laser (585nm FLPDL) is considered now the first choice in the treatment of PWSs. The wavelength of the standard FLPDL is 585nm, and the pulse duration is 0.45 msec. It depends on the theory of selective photothermolysis to cause thermal coagulation of the ecstastic vessels of PWSs. The standard FLPDL systems are usually associated with epidermal cooling techniques to prevent non-selective thermal damage of epidermis. The results of treating PWSs by the standard FLPDL are excellent, especially in children.

Materials and Method

The laser medical system used in this study was the standard flashlamp-pumped pulsed dye laser (585 nm wavelength and 0.45 msec pulse duration), with a dynamic cooling device (cryogen spray type HFC 134a). It was manufactured by Candela Corporation, and called **C.beam system**.

Eleven children with PWSs were included in this study. All the patients were treated by the Candela C.beam system in the Beckman Laser Institute, University of California Irvine. The selection of the patients was random. All patients who were treated in the period from November 2003 to January 2004 and their parents gave agreement, were included in this study.

Before starting the laser therapy, the usual laser safety precautions were checked, especially the eye goggles for the medical staff and the eye shields for the patients. The laser therapy was done under general anesthesia. The 10 mm diameter spot size handpiece delivery system was used for all patients. The desired fluence was adjusted and calibrated. The handpiece was held steadily with the distant guide in contact and perpendicular to skin, and the delivery cable was not bended. Starting a laser pulse on a part of PWSs that was not very obvious in the face to check the fluence and other parameters performed the treatment. The used parameters were 40 msec cryogen spray duration with 30 msec delay, and 6-7 J/cm² fluence for thick skin areas and 5 J/cm² for thin skin areas. The proper response was achieved when the impacted spot of PWSs became purple. Laser impactions were continued to cover the whole PWSs.

Results and Discussion

The most important results achieved in this study were:

- The response of PWSs in head and neck to the 585nm FLPDL therapy was excellent in 73% and good in 27%. Therefore the used 585nm FLPDL was considered very effective in treating PWSs in children

- The adverse sequels as purpura and swelling lasted for few days only. And the complications were minimal. Therefore the characteristics of the used 585nm FLPDL and the method (pre-operative preparation, operative technique and post-operative care) were excellent
- The used 585nm FLPDL could be used with excellent results and minimal complications for skin types I, II, III, IV. So the 585nm FLPDL could be used effectively and safely to treat Iraqi patients with PWSs.
- There were no injuries and no accidents due to laser therapy; because of obeying all laser safety precautions.
- The patients and their parents were very satisfied with the results.

Conclusion and Recommendation

The used 585nm FLPDL with cryogen spray epidermal cooling is a very effective laser device to treat PWSs, especially in children. It is necessary to have the 585nm FLPDL with epidermal cooling in order to treat patients with PWSs