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## Vbeam® Pulsed Dye Laser Treatment of PWS in the Context of Sturge-Weber Syndrome

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### Introduction

Port wine stains (PWS) are capillary vascular malformations that occur in approximately three of 1,000 newborns. While port wine stains on newborns are flat, pink, and blanchable, a PWS will usually grow in proportion to the child's growth, tending to get larger in area, as well as generally darker with age. If left untreated, these malformations can potentially produce vascular ectasias, nodules, and "blebs." On average, 65% of patients with facial PWS develop hypertrophy and nodularity by age 50.<sup>1</sup>

Approximately 8% of newborns with facial PWS are at risk of developing Sturge-Weber syndrome (SWS).<sup>2</sup> Indeed, the typical manifestations of SWS include a facial PWS (usually over the upper eyelid), in addition to contralateral hemiparesis, seizures, glaucoma, and mental retardation.

The treatment of PWS was revolutionized by the development of the pulsed dye laser in the early 1980s. Since then, manufacturers have made several improvements in technology, which have significantly improved treatment efficacy and outcome.

### Method

A.R. was first evaluated at age five months, in August 2000. She had a PWS affecting her right forehead, upper eyelid, temple, and

frontal scalp, and the early onset of seizures, which is characteristic of SWS. The diagnosis was confirmed by a positive MRI scan showing atrophy on the right part of the brain.

Treatment with the Vbeam began in September 2000, with the following parameters: 9-10 J/cm<sup>2</sup>, 7 mm spot, and 1.5 ms pulse duration, with the Dynamic Cooling Device™ (DCD™) set at 30 ms spray and 10 ms delay.

The second treatment was carried out in November 2000 with identical parameters but with a DCD setting of 30 ms spray and 30 ms delay.

The third treatment was carried out in March 2001 with identical parameters.

There was double pulsing of the scalp to determine if the mark would clear faster at 10 J/cm<sup>2</sup> with stacked pulses.

The total number of pulses was 120-130 per treatment. The entire affected area was treated during each session. Treatment endpoint was mild to moderate purpura immediately after treatment.

All treatments were performed in the Ambulatory Surgery Center at Tucson Medical Center under general anesthesia, with a laryngeal mask airway.



### Results

A.R.'s PWS cleared more than 50% after the first two treatments. After the third treatment, an additional 10-15% clearance was obtained. The area double pulsed over the scalp has cleared 90% after three treatments.

There were no side effects other than transient purpura and some periorbital swelling.

### Discussion

This child's condition improved dramatically, and she has had a very gratifying response after only a few treatments.

The Vbeam builds upon the strength of older pulsed-dye technology for the treatment of vascular lesions, including PWS. While the Vbeam offers the flexibility of treating at longer pulse durations (1.5-40 ms), most PWS respond best to the shorter range of pulse durations (1.5-6 ms), with a fluence sufficient to produce moderate to marked purpura as the end point.

The purpura produced by the Vbeam is usually not the "eggplant purpura", typical of older pulsed-dye technology (585 nm). Moreover, some patients feel that the Vbeam purpura does not last as long as that obtained with older pulsed-dye technology.

The DCD has enabled not only the use of higher fluences (hence more effective and rapid clearance), but also the treatment of darker-skinned patients. We can successfully treat Hispanic patients as well as Oriental patients suffering from PWS with the Vbeam. For skin types III and IV, the fluence must be closely monitored, as there is the potential for enhanced purpura and temporary epidermal change, such as transient

pigmentary abnormality. Scarring is a very rare occurrence with the Vbeam. The DCD also provides additional comfort for many infants, young children, and adults undergoing treatment under local anesthesia or conscious sedation.

Overall, treatment with the Vbeam usually produces a significant clearance of PWS, whether or not the lesion is associated with SWS. While the case of a particular patient has been described here, some 50-75% clearance has been obtained in most patients with PWS after an average of three to seven treatments.

### Bibliography

1. Geronemus RG, Ashinoff R. "The Medical Necessity of Evaluation and Treatment of Port Wine Stains." *J. Dermatol. Surg. Oncol.* 17 (1991) 76-9.
2. Morelli JG. Port Wine Stains and the Sturge-Weber Syndrome, from *Sturge-Weber Syndrome*, edited by Bodensteiner JB and Roach ES, Sturge-Weber Foundation.



Figure 1—Pretreatment



Figure 2—After 3 treatments

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