Title

THE USE OF OPTICAL COHERENCE TOMOGRAPHY TO DETERMINE PORT WINE BIRTHMARK LASER TREATMENT RESPONSE

Authors

Baugh, Erica
Ng, Ashley
Moon, John
et al.

Publication Date

2022

Peer reviewed

THE USE OF OPTICAL COHERENCE TOMOGRAPHY TO DETERMINE PORT WINE BIRTHMARK LASER TREATMENT RESPONSE

Erica Baugh, Ashley Ng, John Moon, Jennifer Tran, Ellen Bruhn, Beth A. Drolet, Lisa M. Arkin, Kristen M. Kelly

University of California, Irvine, CA, USA; University of Wisconsin, Madison, WI, USA

Background: Capillary malformations (Port Wine Birthmark or PWB) affect 0.3%–0.5% of newborns and impact quality of life due to nodularity and disfigure-ment. Laser is the current standard of care which targets aberrant blood vessels, though up to 50% of patients remain refractory. Dynamic optical coherence tomogra-phy (D-OCT) is a noninvasive device which uses flow-based imaging to quantify vessel size, density, and depth of blood vessels of the skin. The aim of this study is to use D-OCT to investigate vascular features associated with laser treatment response.

Study Design/Materials and Method: Patients with PWBs on the cheek, temple, or jawline were recruited to participate in a multi-institutional prospective study. Demographic data, medical history, and clinical photographs were obtained. D-OCT measurements were taken of the PWB and of anatomically matched control areas. Response to laser treatment was graded using a visual analog scale comparing pretreatment and posttreatment photographs. Statistical analyses were conducted using SPSS software.

Results: Twenty-eight subjects were included, mostly males (15, 54%) with ages ranging from 4 months to 68 years. Linear regression of vessel diameter, density, and depth as a function of age did not reveal significant correlations. Patients were assessed for laser responsiveness. In comparison to excellent responders, poor responders had significantly larger vessel diameters (p = 0.010) and greater vessel density (p = 0.043). Some D-OCT images showed dark areas which we believe to be areas of low blood flow not detected by D-OCT.

Conclusion: Inherent differences in PWB vasculature may affect laser responsiveness. We did not find significant correlations between vessel depth, diameter, density, and age. This may reflect referral bias in a population extensively treated with laser and limitations of D-OCT technology, which relies on detection of flow. Dark areas on D-OCT imaging may reveal the need for an improved algorithm to account for areas of low blood flow.