New non-invasive treatment of basal cell carcinoma

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Research conducted by H. Ray Jalian, M.D., Mathew M. Avram, M.D., J.D., Kelly J. Stankiewicz, M.D., Joshua D. Shofner, M.D., and Zeina Tannous, M.D. was selected as Editor's Choice for the January 2014 issue of *Lasers in Surgery and Medicine* (LSM).

The manuscript titled "Combined 585nm Pulsed-Dye and 1,064nm Nd:YAG Lasers for the Treatment of Basal Cell Carcinoma" was published in *LSM*, the official journal of the American Society for Laser Medicine and Surgery, Inc. (ASLMS).

Basal cell carcinoma (BCC) is the most common skin cancer diagnosed and treated in the United States today. The current traditional mainstays of therapy include surgical excision, Mohs surgery and destruction by electrodessication and cautery. More recently, studies have investigated the role of laser in providing non-invasive, scar-free treatment of BCCs. Such treatments have the potential to treat skin cancers while reducing pain and infection without scar and without the need for sutures. A team of Harvard researchers, Jalian, et al., have just published the most recent study to determine the effect of repeated treatment with a combined pulsed dye laser (PDL) and Nd:YAG laser on BCCs.

"BCC are characterized by a specialized tumor-associated microvasculature interwoven throughout the tumor bed. By utilizing the theory of selective photothermolysis, vascular specific lasers can specifically target and destroy these abnormal blood vessels and result in the selective destruction of the BCC cells with minimal damage to the surrounding tissue. We have previously demonstrated the efficacy of other vascular specific lasers such as pulsed dye and alexandrite lasers in the treatment of BCC. In this study, we again confirm the efficacy of a combined pulsed dye and Nd:YAG vascular specific laser for BCC treatment," said Dr. Tannous.

Dr. Tannous is an associate professor and founding chairman of dermatology at Gilbert and Rose-Marie Chagoury School of Medicine, and chief of dermatology at UMC-RH. She is also on faculty at Harvard Medical School and is a graduate of the American University of Beirut School of Medicine.

According to the manuscript, "The objective of the study was to determine the effect of repeated treatment with a combined pulsed dye laser (PDL) and Nd:YAG laser on BCCs of superficial and nodular subtypes of varying diameters."

"This study reflects our continuing efforts to target the vasculature of basal cell carcinomas as a method to treat them noninvasively and without scar. These findings will help us to refine further strategies for laser-based anti-angiogenesis treatments of basal cell carcinoma," commented Dr. Avram.

Dr. Avram is the director of the Massachusetts General Hospital Dermatology Laser & Cosmetic Center. He is an assistant professor of dermatology at Harvard Medical School, where he is also faculty director for procedural training in the department of dermatology.

Ten subjects with 13 biopsy-proven BCCs received four combined PDL and Nd:YAG at treatments 2–4 week intervals. None of the BCCs met the criteria for Mohs micrographic surgery. The tumor and 4 mm of peripheral skin were treated using standardized parameters delivered with a 7 mm spot with 10% overlap. The treated area was excised and evaluated histologically for residual tumor. The primary study endpoint was histologic clearance of tumor. The secondary study endpoint was blinded investigator assessment of clinical endpoint and adverse effects.

"The findings in this research study underscore the potential utility of using vascular lasers to target skin cancer. All cancers, whether they are in the skin or elsewhere, rely on a rich blood supply to support rapid growth of the tumor. Often times these blood vessels are abnormal and different from the surrounding blood vessels in the tissue. If we are able to selectively target them, then we may be able to inhibit growth of tumors. In this study, we combined two different wavelengths of light that target blood. We found that many skin cancers less than 1.5 cm cleared with a series of 4 treatments. This study also uncovered some potential reasons for treatment failure including tumors that were of a certain subclass (superficial basal cell carcinoma) and the use of blood thinners which may inhibit clot formation after laser treatment," said Dr. Jalian.

H. Ray Jalian, MD is a board certified dermatologist with advanced fellowship training in various applications of lasers and light sources in dermatology. Currently, he is clinical instructor in the Division of Dermatology at the University of California, Los Angeles. He is the author of over 20 peer reviewed manuscripts and book chapters. Current clinical and research interests include device based therapeutics for acne, treatment of vascular malformations, and tattoo removal.

The study concluded that, "Combined PDL and Nd:YAG laser is an effective means of reducing tumor burden in patients with BCC and may be a promising, emerging alternative therapy. Factors influencing treatment response includes the concomitant use of anticoagulation. Further studies are needed to investigate and optimize the utility of this treatment protocol."

The Editor-in-Chief of *LSM*, J. Stuart Nelson, M.D., Ph.D. commented on the study, "Current treatments for basal cell carcinoma (BCC) are largely surgical with a high risk of scarring. In the article, "Combined 585 nm Pulsed-Dye and 1064 nm Nd:YAG Lasers for the Treatment of Basal Cell Carcinoma" Jalian et al report a methodology demonstrating non-invasive treatment of BCC, selectively targeting the vasculature of these tumors with sequential pulses of two vascular lasers. Optimization of this treatment may provide clinical and histologic clearance of tumor with lower morbidity for patients, and better cosmetic outcome."

More information: "Combined 585nm Pulsed-Dye and 1,064nm Nd:YAG Lasers for Treatment of Basal Cell Carcinoma." Jalian, R. H., Avram, M. M., Stankiewicz, K. J., Shofner, J. D., Tannous, Z. (2014), *Lasers Surg. Med.*, 46: 1-7. DOI: 10.1002/lsm.22201

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