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Reflectance confocal microscopy-guided laser ablation of basal cell carcinomas: initial clinical experience.

Sierra H, Yélamos O, Cordova M, Chen CJ, Rajadhyaksha M. *J Biomed Opt.* 2017 Aug;22(8):1-13. doi: 10.1117/1.JBO.22.8.085005.

ABSTRACT

Laser ablation offers a procedure for precise, fast, and minimally invasive removal of superficial and early nodular basal cell carcinomas (BCCs). However, the lack of histopathological confirmation has been a limitation toward widespread use in the clinic. A reflectance confocal microscopy (RCM) imaging-guided approach offers cellular-level histopathology-like feedback directly on the patient, which may then guide and help improve the efficacy of the ablation procedure. Following an ex vivo benchtop study (reported in our earlier papers), we performed an initial study on 44 BCCs on 21 patients in vivo, using a pulsed erbium:ytterbium aluminum garnet laser and a contrast agent (aluminum chloride). In 10 lesions on six patients, the RCM imaging-guided detection of either presence of residual tumor or complete clearance was immediately confirmed with histopathology. Additionally, 34 BCCs on 15 patients were treated with RCM imaging-guided laser ablation, with immediate confirmation for clearance of tumor (no histopathology), followed by longer-term monitoring, currently in progress, with follow-up imaging (again, no histopathology) at 3, 6, and 18 months. Thus far, the imaging resolution appears to be sufficient and consistent for monitoring efficacy of ablation in the wound, both immediately postablation and subsequently during recovery. The efficacy results appear to be promising, with observed clearance in 19 cases of 22 cases with follow-ups ranging from 6 to 21 months. An additional 12 cases with 1 to 3 months of follow-ups has shown clearance of tumor but a longer follow-up time is required to establish conclusive results. Further instrumentation development will be necessary to cover larger areas with a more automatically controlled instrument for more uniform, faster, and deeper imaging of margins. (2017) COPYRIGHT Society of Photo-Optical Instrumentation Engineers (SPIE). KEYWORDS: basal cell carcinoma; confocal microscopy; image-guided therapy; laser ablation; skin cancer PMID: 28831793 PMID: PMC5566590 DOI: 10.1117/1.JBO.22.8.085005