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Routine application of ex vivo confocal laser scanning microscopy with digital staining for examination of surgical margins in basal cell carcinomas

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ABSTRACT

Background and objectives: Ex vivo confocal laser scanning microscopy (CLSM) allows histologic examination of native tissue based on tissue reflection and nuclear fluorescence staining. The newly introduced digital staining process almost perfectly mimics conventional hematoxylin and eosin (HE) slides. The aim was to evaluate the new method in clinical routine, with regard to quality of findings and time requirements, in the examination of surgical margins of basal cell carcinomas. Patients and methods: 78 patients with 101 basal cell carcinomas were prospectively enrolled. Surgery was performed either with complete margin control (n = 60) or as elliptical excision (n = 41). Immediately after excision specimens were scanned with CLSM and then routinely processed by conventional histopathology. Blinded evaluation of images and slides was performed by a dermatopathologist. Results: Basal cell carcinomas were excellently recognizable by CLSM directly after excision, and the use of digital staining did not require any adjustment of the examiner's visualization preferences. CLSM images showed a sensitivity of 73.6 % and a specificity of 96.5 % compared to conventional HE stained slides. Erroneous findings were often due to limited assessment potential in cases where the epidermis could not be fully visualized. Conclusions: CLSM with digital HE staining is very well suited to diagnose basal cell carcinomas and their incision margins even under routine conditions and thus represents a tissue-saving alternative to rapid cryostat sectioning. © 2021 The Authors. Journal der Deutschen Dermatologischen Gesellschaft published by John Wiley & Sons Ltd on behalf of Deutsche Dermatologische Gesellschaft. PMID: 33768732 DOI: 10.1111/ddg.14374