Diagnostic accuracy of a new ex vivo confocal laser scanning microscope compared to H&E-stained paraffin slides for micrographic surgery of basal cell carcinoma.


ABSTRACT

BACKGROUND: For safe excision of malignant skin tumours, complete negative surgical margins are mandatory. The gold standard for analysis is frozen sections or paraffin-embedded haematoxylin and eosin (H&E)-stained slides. The production of H&E-stained slides is time-consuming (>20 h) while wounds remain unclosed. An upcoming method is confocal laser scanning microscopy (CLSM), a technique that scans unfixed fresh tissue rapidly. OBJECTIVE: Evaluation of the process to generate and analyse CLSM images and assessment of the accuracy to detect basal cell carcinoma (BCC) tissue. METHODS: Digital microscopic images were generated by the Histolog Scanner v1 from 544 fresh specimens of 148 BCCs that had been stained with a 0.01% proflavine solution. CLSM images were compared to the histological diagnoses of the corresponding H&E-stained slides. RESULTS: A total of 525 images could be analysed. The sensitivity was 73% (95% CI = [65.27%; 80.47%]), and the specificity was 96% (95% CI = [93.40%; 97.60%]). Detection of BCCs in punch biopsies was certainly detected (sensitivity of 100%). The median total time to generate and evaluate a CLSM image was 5.17 min (maximum 20.17 min and minimum 2.05 min). The greatest challenge was flattening the specimen to assure complete representation of the surgical margins. CONCLUSION: Confocal laser scanning microscopy is a time-saving and very effective alternative to classical paraffin-embedded or frozen sections. Patient treatment could be improved due to shorter hospital stays or faster outpatient therapy due to reduced intervals between surgical stages. Diagnostic accuracy of the microscope used still must be improved. © 2018 European Academy of Dermatology and Venereology. PMID: 30198589 DOI: 10.1111/jdv.15243