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40 | **Detection of basal cell carcinomas in Mohs excisions with fluorescence confocal mosaicing microscopy.**

ABSTRACT

BACKGROUND: High-resolution real-time imaging of human skin is possible with a confocal microscope either in vivo or in freshly excised tissue ex vivo. Nuclear and cellular morphology is observed in thin optical sections, similar to that in conventional histology. Contrast agents such as acridine orange in fluorescence and acetic acid in reflectance have been used in ex vivo imaging to enhance nuclear contrast.

OBJECTIVES: To evaluate the sensitivity and specificity of ex vivo real-time imaging with fluorescence confocal mosaicing microscopy, using acridine orange, for the detection of residual basal cell carcinoma (BCC) in Mohs fresh tissue excisions.

METHODS: Forty-eight discarded skin excisions were collected following completion of Mohs surgery, consisting of excisions with and without residual BCC of all major subtypes. The tissue was stained with acridine orange and imaged with a fluorescent confocal mosaicing microscope. Confocal mosaics were matched to the corresponding haematoxylin and eosin-stained Mohs frozen sections. Each mosaic was divided into subsections, resulting in 149 submosaics for study. Two Mohs surgeons, who were blinded to the cases, independently assessed confocal submosaics and recorded the presence or absence of BCC, location, and histological subtype(s). Assessment of confocal mosaics was by comparison with corresponding Mohs surgery maps.

RESULTS: The overall sensitivity and specificity of detecting residual BCC was 96.6% and 89.2%, respectively. The positive predictive value was 92.3% and the negative predictive value 94.7%. Very good correlation was observed between confocal mosaics and matched Mohs frozen sections for benign and malignant skin structures, overall tumour burden and location, and identification of all major histological subtypes of BCC.

CONCLUSIONS: Fluorescent confocal mosaicing microscopy using acridine orange enables detection of residual BCC of all subtypes in Mohs fresh tissue excisions with high accuracy. This observation is an important step towards the long-term clinical goal of using a noninvasive imaging modality for potential real-time surgical pathology-at-the-bedside for skin and other tissues.