In vivo detection of basal cell carcinoma: comparison of a reflectance confocal microscope and a multiphoton tomograph.


ABSTRACT

The standard diagnostic procedure for basal cell carcinoma (BCC) is invasive tissue biopsy with time-consuming histological examination. To reduce the number of biopsies, noninvasive optical methods have been developed providing high-resolution skin examination. We present direct comparison of a reflectance confocal microscope (RLSM) and a multiphoton tomograph (MPT) for BCC diagnosis. Both systems are applied to nine patients prior to surgery, and the results are analyzed, including histological results. Both systems prove suitable for detecting typical characteristics of BCC in various stages. The RLSM allows large horizontal overview images to be obtained, enabling the investigator to find the regions of interest quickly, e.g., BCC nests. Elongated cells and palisading structures are easily recognized using both methods. Due to the higher resolution, changes in nucleus diameter or cytoplasm could be visualized with the MPT. Therefore, the nucleus diameter, nucleus/cytoplasm ratio, and cell density are estimated for normal and BCC cells using the MPT. The nucleus of elongated BCC cells is significantly longer than other measured normal skin cells, whereas the cell density and nucleus/cytoplasm ratio of BCC cannot be significantly distinguished from granular cells.