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Ultrasound and Infrared-Based Imaging Modalities for Diagnosis and Management of Cutaneous Diseases.

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ABSTRACT

Non-invasive bedside imaging tools are becoming more prevalent for assessing cutaneous lesions. Ultrasound used at specific frequencies allows us to assess margins of lesions to minimize the extent of the biopsy that is performed and improve cosmetic outcomes. Vascularity, seen on Doppler ultrasound and contrast-enhanced ultrasound, and stiffness, assessed on tissue elastography, can help differentiate between benign and malignant lesions for clinicians to be more judicious in deciding whether to biopsy. Moreover, research has shown the efficacy in using ultrasound in monitoring flares of hidradenitis suppurativa, a disease affecting apocrine gland-rich areas of the body, for which the current gold standard involves examining and scoring inflammatory lesions with the naked eye. Infrared-based modalities have also been on the uptrend to aid in clinical decision-making regarding suspiciousness of lesions. Reflectance confocal microscopy has lateral resolution that is comparable to histopathology and it has been shown to be an appropriate adjunctive tool to dermoscopy, specifically when evaluating melanomas. Optical coherence tomography has utility in determining lesion thickness because of its depth penetration, and spectrophotometric intracutaneous analysis is becoming more popular as a tool that can be used by general practitioners to know when to refer to dermatology regarding worrisome pigmented lesions. Strides have been made to incorporate electrical impedance spectroscopy alongside dermoscopy in decision-making regarding excision, although the evidence for its use in the clinical setting remains inconclusive. This paper reviews the efficacy and drawbacks of these techniques in the field of dermatology and suggests future directions. **KEYWORDS:** dermatology; electrical impedance spectroscopy; hidradenitis suppurativa; non-invasive imaging; optical coherence tomography; reflectance confocal microscopy; spectrophotometric intracutaneous analysis; ultrasound PMID: 29922650 PMCID: PMC5996893 DOI: 10.3389/fmed.2018.00115