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Comparison of Real-Time Fluorescence Confocal Digital Microscopy With Hematoxylin-Eosin-Stained Sections of Core-Needle Biopsy Specimens.

Krishnamurthy S, Sabir S, Ban K, Wu Y, Sheth R, Tam A, Meric-Bernstam F, Shaw K, Mills G, Bassett R, Hamilton S, Hicks M, Gupta S. *JAMA Netw Open*. 2020 Mar 2;3(3):e200476. doi: 10.1001/jamanetworkopen.2020.0476.

ABSTRACT

IMPORTANCE: Strategies to procure high-quality core-needle biopsy (CNB) specimens are critical for making basic tissue diagnoses and for ancillary testing. **OBJECTIVES:** To investigate acquisition of fluorescence confocal microscopy (FCM) images of interventional radiology (IR)-guided CNB in real time in the radiology suite and to compare the accuracy of FCM diagnoses with those of hematoxylin-eosin (H&E)-stained CNB sections. **DESIGN, SETTING, AND PARTICIPANTS:** In this diagnostic study, FCM imaging of IR-guided CNBs was performed in the radiology suite at a major cancer center for patients with an imaging abnormality from August 1, 2016, to April 30, 2019. The time taken to acquire FCM images and the quality of FCM images based on percentage of interpretable tissue with optimal resolution was recorded. The FCM images were read by 2 pathologists and categorized as nondiagnostic, benign/atypical, or suspicious/malignant; these diagnoses were compared with those made using H&E-stained tissue sections. Cases with discrepant diagnosis were reassessed by the pathologists together for a consensus diagnosis. Data were analyzed from June 3 to July 19, 2019. **INTERVENTIONS:** Each IR-guided CNB was stained with 0.6mM acridine orange, subjected to FCM imaging, and then processed to generate H&E-stained sections. **MAIN OUTCOMES AND MEASURES:** Mean time taken for acquisition of FCM images, quality of FCM images based on interpretable percentage of the image, and accuracy of diagnostic categorization based on FCM images compared with H&E-stained sections. **RESULTS:** A total of 105 patients (57 male [54.3%]; mean [SD] age, 63 [13] years) underwent IR-guided CNBs in a mean (SD) of 7 (2) minutes each. The FCM images showed at least 20% of the tissue with optimal quality in 101 CNB specimens (96.2%). The FCM images were accurately interpreted by the 2 pathologists in 100 of 105 cases (95.2%) (2 false-positive and 3 false-negative) and 90 of 105 cases (85.7%) (6 false-positive and 9 false-negative). A reassessment of 14 discordant diagnoses resulted in consensus diagnoses that were accurate in 101 of 105 cases (96.2%) (1 false-positive and 3 false-negative). **CONCLUSIONS AND RELEVANCE:** The ease of acquisition of FCM images of acceptable quality and the high accuracy of the diagnoses suggest that FCM may be useful for rapid evaluation of IR-guided CNBs. This approach warrants further investigation.

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