Detection of synovitis in the hands of patients with rheumatologic disorders: diagnostic performance of optical imaging in comparison with magnetic resonance imaging.

Abstract:
To prospectively compare an indocyanine green (ICG)-enhanced optical imaging system with contrast-enhanced magnetic resonance imaging (MRI) for the detection of synovitis in the hands of patients with rheumatologic disorders. Forty-five patients (30 women [67%], mean ± SD age 52.6 ± 13.4 years) in whom there was a clinical suspicion of an inflammatory arthropathy were examined with a commercially available device for ICG-enhanced optical imaging as well as by contrast-enhanced 3T MRI as the standard of reference. Three independent readers graded the degree of synovitis in the carpal, metacarpophalangeal, proximal interphalangeal, and distal interphalangeal joints of both hands (1,350 joints), using a 4-point ordinate scale (0 = no synovitis, 1 = mild, 2 = moderate, 3 = severe). Statistical analyses were performed using a logistic generalized estimating equation approach. Agreement of optical imaging ratings made by the different readers was estimated with a weighted kappa coefficient. When MRI was used as the standard of reference, optical imaging showed a sensitivity of 39.6% (95% confidence interval [95% CI] 31.1-48.7%), a specificity of 85.2% (95% CI 79.5-89.5%), and accuracy of 67.0%.
(95% CI 61.4-72.1%) for the detection of synovitis in patients with arthritis. Diagnostic accuracy was especially limited in the setting of mild synovitis, while it was substantially better in patients with severely inflamed joints. Moderate interreader and intrareader agreement was observed. The evaluated ICG-enhanced optical imaging system showed limitations for the detection of inflamed joints of the hand in comparison with MRI.